Vol. I OCTOBER, 1919 No. 1

# THE PAPER INDUSTRY

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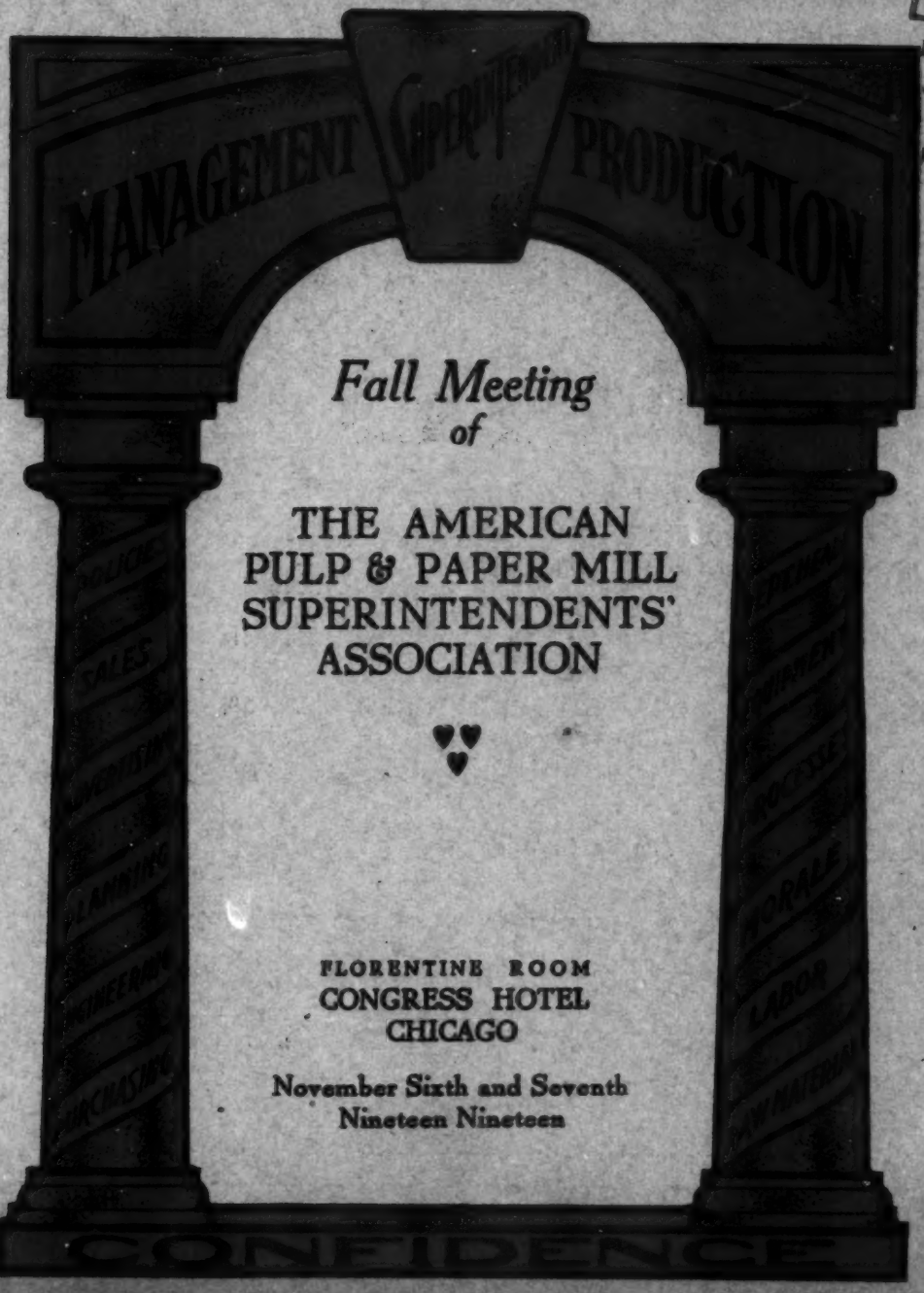


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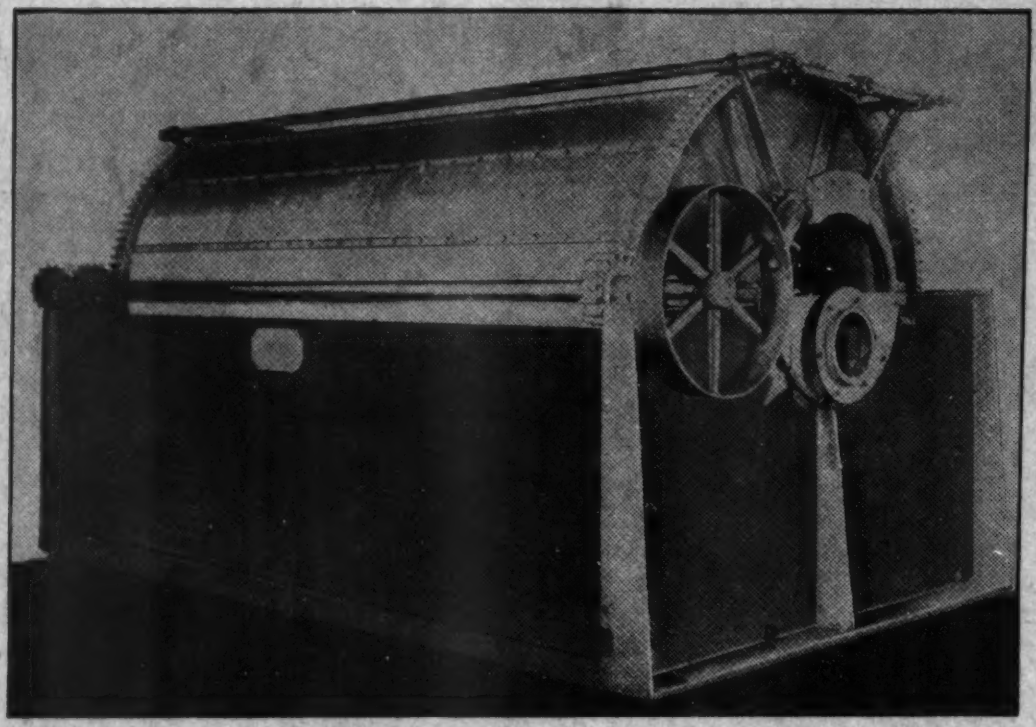

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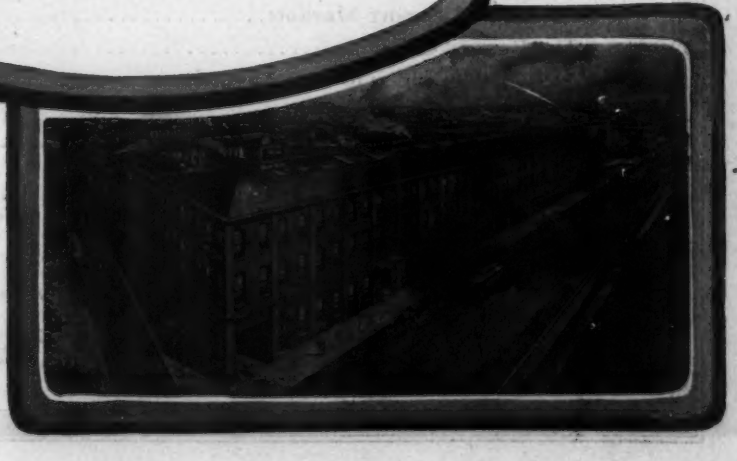

Vol. 1—No. 7

THE PAPER INDUSTRY

PETER J. MASSEY
Editor

A MONTHLY EDUCATIONAL JOURNAL
*Devoted to the Interests of The Paper Industry*

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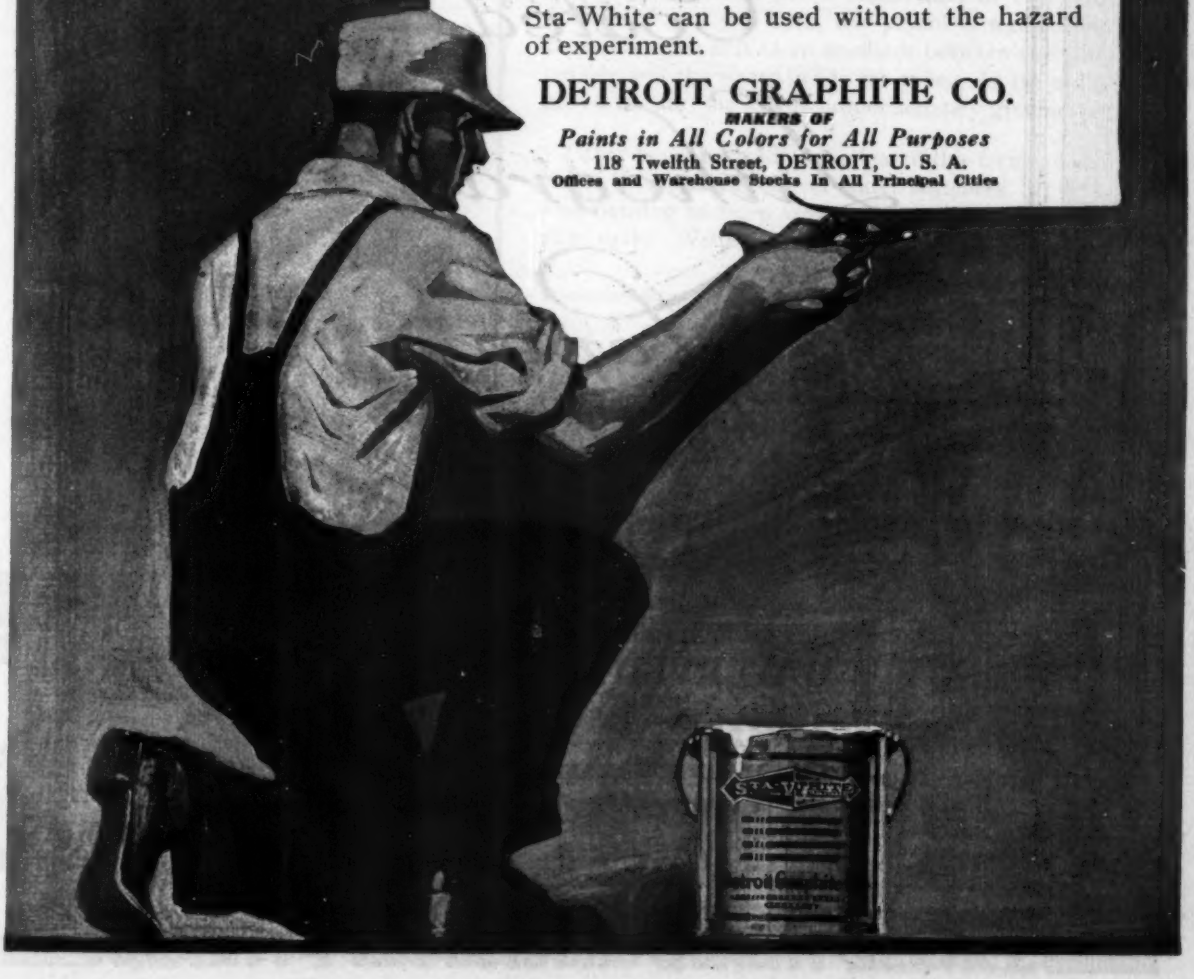

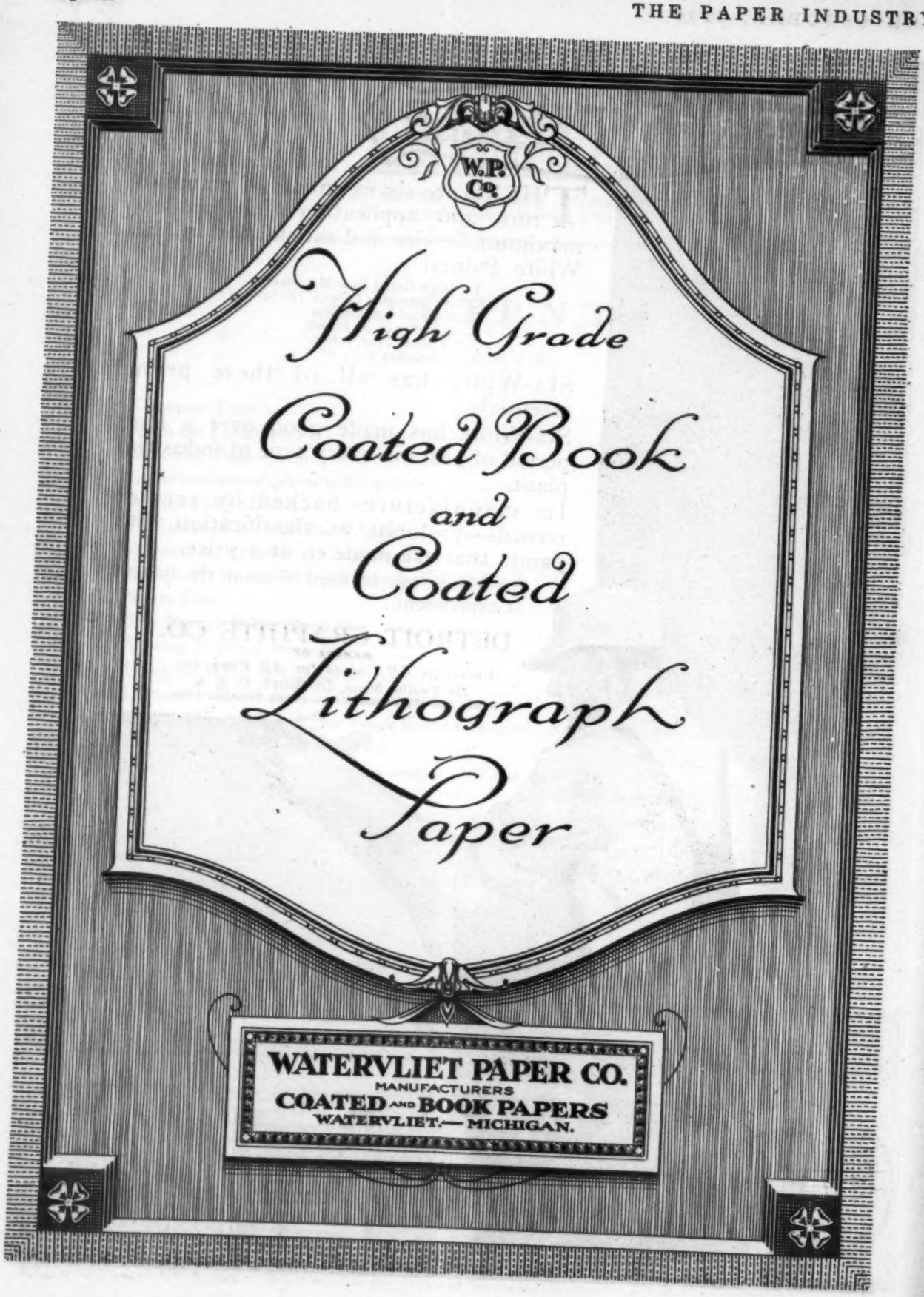
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# *To Pulp and Paper Manufacturers and General Managers*

YOU have, no doubt, read considerable in former issues of THE PAPER INDUSTRY about the American Pulp and Paper Mill Superintendents' Association. Several meetings of the Michigan branch have been held at Kalamazoo, and several meetings of the Northwestern branch at Green Bay and Wausau, Wisconsin. This issue contains several excellent papers read at the last meeting, by Mr. Bert, on Box Boards, and another by Mr. O'Connell, on Sulphite Pulp.

By reading the proceedings of this meeting you will also get some ideas of the talk of Mr. Fred C. Boyce, President of the Association, and as well as others, who were there. You will note that quite a number of prominent manufacturers also were at this meeting. All of the meetings of this Association are open so that any one may attend and be benefited by the valuable papers read there.

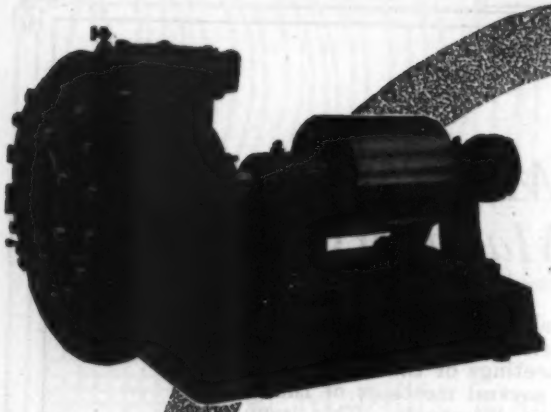
It has come to our notice several times that certain manufacturers were a little sceptical, fearing that it might not be for the good of the industry. If they were to read these papers as prepared for these occasions, a number of which have been published in former issues, it would be easy to see what a tremendous good it is for the whole industry to have these men getting together.

A superintendent is part of the management of a paper mill, and he needs to be as big a man as possible in order to not only have charge of the manufacture, but to have charge of the men in these strenuous times. As one manufacturer stated at the last meeting, he felt it was a good thing for these men to get together and learn one from another, and that he notices that when his men come back from such a meeting, that they are better able to cope with their problems, and are really better paper makers.

This Association was formed for the good of the industry. In all other lines of endeavor men who are the responsible heads in their industry, as the superintendent is in this industry, get together and talk over the many problems that confront them as a whole. Each one's problem is somewhat different, his condition is different, his mill is different, but in a general sense their problems are the same. No one can learn very much without rubbing elbows and getting in contact with the other men of like kinds and in the same field of work. Therefore, we felt that it was the proper thing to do, and since this organization was formed, we felt that nothing has as yet been done in the industry which means so much real good as the formation and growth of this big Association.

The first semi-annual meeting will be held in Chicago at the Congress Hotel, November 6 and 7, and it is desired that not only every pulp and paper mill superintendent be there, but that as many presidents, managers, and others of the pulp and paper mills as is possible to attend. Every one is welcome, for it is thoroughly understood by those that have already attended these meetings that it pays and that a great good is gotten out of each one.

The Publisher of THE PAPER INDUSTRY wants to assure the whole paper making fraternity that the only thought in organizing this Association was for the good of the industry and feels that every man who comes to Chicago to attend this meeting will be greatly repaid for the time and money expended.



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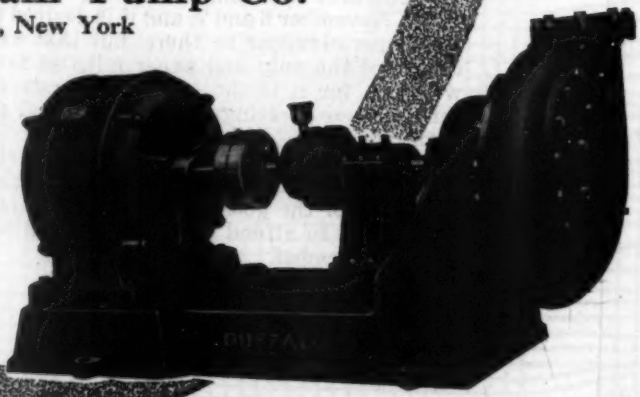

# EDITORIAL

IT is difficult to see any reason in all the commotion that is going on about the League of Nations. Both sides in this controversy declare their chief aim is to abolish War, and bring about universal peace.

We are now experiencing the greatest industrial war in our history. Battles are being fought in every industry. There are strikes going on in every city in the country, and yet our public men, who ought to be strenuously endeavoring to work out a solution, are flying at each others' throats in their very ambitious efforts to provide the world with their own private brand of sugar coated panacea for universal peace.

Peace, like charity, should begin at home. If these gentlemen, individually and collectively, come down off their lofty pedestals to the level of the commoners, they will be able to see things in their true perspective, an impossible task with the low visibility that obscures their vision when their heads are above the clouds.

Strikes are Industrial War, the very worst kind of War. We are experiencing right now the greatest Industrial War in the World's history, the battle ground of which is from the Lakes to the Gulf and from Ocean to Ocean. A conflagration that threatens to consume us, and our great men are fiddling with the League of Nations.

We are at the gateway to the greatest era of prosperity the world has ever known, yet we cannot enter because a small minority have chosen this time to fight, and we have no power to stop them. The only privilege they have not taken from us is paying the bill, which we always do, irrespective of who wins the fight.

President Wilson is reported as having said, "He did not propose to countenance the control of Government affairs by any special interests, whether it be labor or capital," which expresses our sentiments exactly. But who is the Government? Is it not the public that is now suffering from a number of "special interests"?

The cure for War, according to the League of Nations advocates, is compulsory arbitration, and a League to enforce the decisions. There will never be a better time, nor place, than right here and now, to prove the success or failure of such a plan. We already have the league to enforce it—a league of forty-eight states—all we need is compulsory arbitration and it is high time that we have it, for labor and capital have made a fizzle of settling their differences long enough, and the Public is tired of paying the bills.

Let us try Compulsory Arbitration; it cannot make conditions any worse than they are. Perhaps it may even permit us to enjoy some of the prosperity that is now waiting for us, if we have enough sense to stop Fighting and go to Work.

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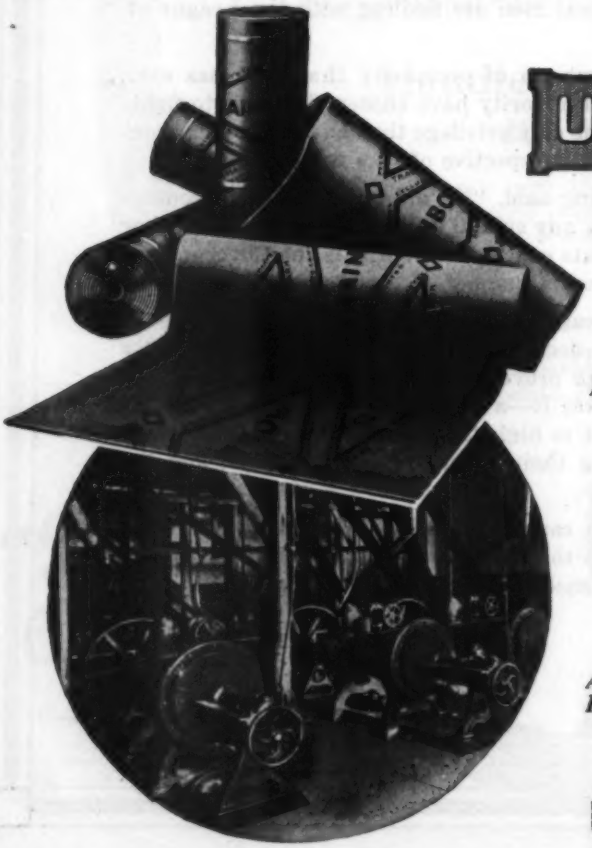

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## United States Rubber Company

# The American Pulp and Paper Mill Superintendents' Association Semi-Annual Meeting at the Hotel Congress, Chicago, on November 6 and 7

## PROGRAM

Thursday, November 6—Morning Session.

9:00 A. M. Registration in Florentine Room, Hotel Congress.

9:30 A. M. Opening Address by Mayor Thompson.

Report of Sulphite Committee, by D. F. O'Connell, Chairman.

Report of Box Board Committee, by Henry Bert, Chairman.

Report of Ground Wood Committee, by John E. Mulchaey, Chairman.

Report of Beater Room Committee, by G. W. Mericle, Chairman.

Address on Casein, by Harry L. Derby.

Afternoon Session.

12:30 P. M. Automobile Trip to the United States Rubber Company.

1:00 P. M. Buffet Lunch.

2:30 P. M. Automobile Trip to the Chicago Mill and Lumber Company.

4:30 P. M. Return to Hotel Congress.

Evening Session.

6:30 P. M. Dinner and Entertainment, Florentine Room.

Friday, November 7—Morning Session.

9:00 A. M. Industrial Relations, by George P. Hambrecht.

Paper Mill Cost System, by W. T. Schmitt.

Preservation of Paper Mill Roofs, by K. Barth.

12:00 M. Luncheon, Florentine Room.

Afternoon Session.

Combined Meeting of Printing and Paper Mill Superintendents.

1:30 P. M. "Relation of Ink and Paper in Half-tone Printing," by H. P. Carruth.

Manufacture of Coated Papers, by Ed. T. A. Coughlin.

Testing of Papers, by Otto Kress.

Difficulties Encountered in Printing Papers, by Peter J. Massey.

General Discussion.

Evening Session.

6:30 P. M. Banquet, Florentine Room.

We will consider it an honor to have you in attendance and any other of your Paper and Pulp Mill Executives who may wish to attend.

We are sure you will be more than repaid for the time expended to attend this meeting and that you will be greatly benefited thereby, so we urge upon you the early acceptance of our invitation.

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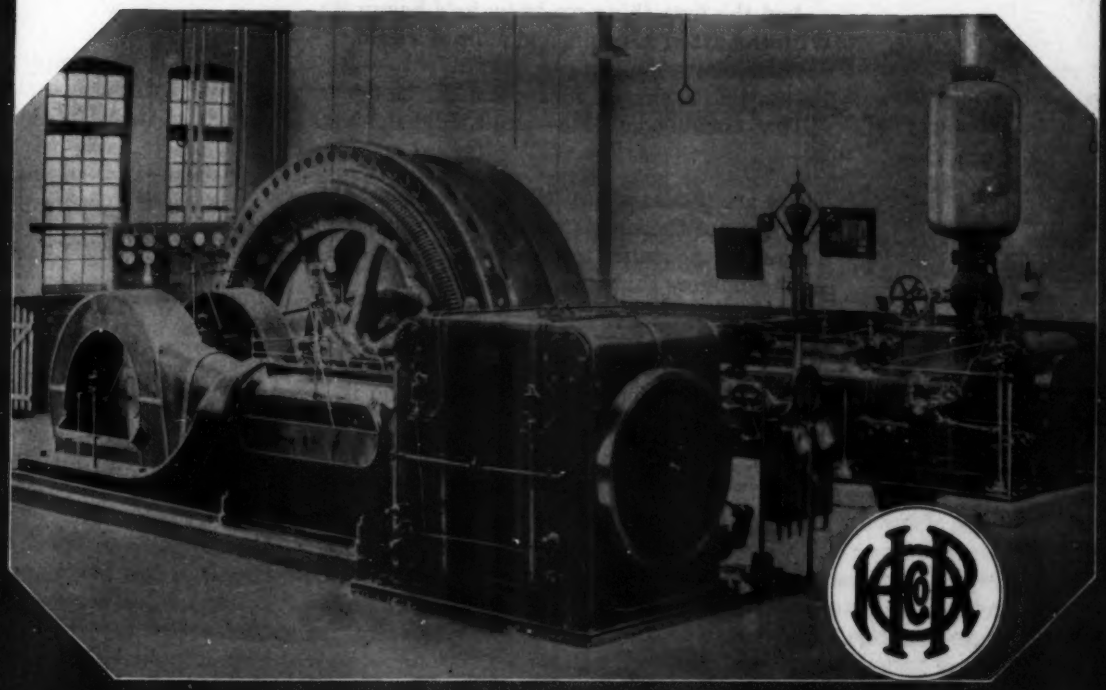


# *Couldn't Be Done— So He Did It*

SOMEBODY said that it couldn't be done,
But he, with a chuckle, replied,
That "Maybe it couldn't," but he would be one
Who wouldn't say so 'til he tried.
So he buckled right in with a trace of a grin
On his face. If he worried, he hid it.
He started to sing as he tackled the thing
That couldn't be done—and he did it.

Somebody scoffed: "Oh, you'll never do that;
At least no one ever had done it."
But he took off his coat and he took off his hat,
And the first thing we knew he'd begun it:
With the lift of his chin, and a bit of a grin,
Without any doubting or quiddit,
He started to sing as he tackled the thing
That couldn't be done—and he did it.

There are thousands to tell you it cannot be done,
There are thousands to prophesy failure;
There are thousands to point out to you, one by one,
The dangers that wait to assail you.
But just buckle in with a bit of a grin,
Then take off your coat and go to it.
Just start in to sing as you tackle the thing
That "cannot be done"—and you'll do it.

*—Herbert Guest*

THE PAPER INDUSTRY

*"The Educational Magazine for the Paper Industry"*

Volume I | OCTOBER, 1919 | Number 7

# ILLUMINATION

## For the Paper Mill

By H. T. SPAULDING
Engineering Department, National Lamp Works

## Part III—Application of the Principles of Good Lighting to Paper Mills

[This article is the third and last of a series, by one of the leading authorities in the new engineering science, that has developed and reached maturity in the last five years. After having made an exhaustive study of the lighting requirements in paper mills, he is offering you the results of applied Illumination Engineering to the paper mills. To every mill which has not as yet had its lighting requirements engineered, these articles will be invaluable.]

IN the applications of the principles laid down in the two preceding articles, much must be left to the judgment of the plant superintendent or his electrical man. While conditions in paper mills are perhaps as well standardized as in any industry of corresponding size, still it is impossible to state definitely just what lamps and equipment or what spacings and mounting heights should be used to obtain satisfactory illumination, without a consideration of the local factors in each case. In this article, however, an attempt will be made to take up each operation in the paper industry by itself, and from an analysis of the requirements give as definite recommendations as possible for the solution of the lighting problem.

### Wood Room

The principal consideration in this portion of the plant is safety to the workmen, and sufficient light must be provided to eliminate all chances of stumbling over obstructions or injury by the machines. A safe intensity of illumination will be found ample for the work carried on. Local lighting over the machines, with the remainder of the area in contrasting darkness, should be avoided. Rather, the room should be completely lighted by a general system to a medium intensity. This result can be accomplished by the use of about one-half watt for each square foot of floor area. The size of lamp to be used will, of course, depend upon the possible mounting height which will vary materially in different mills. It should be borne in mind, however, that while the use of a large lamp tends toward low cost of installation and efficiency of operation, yet there is a decided advantage in the use of a greater number of smaller units. The illumination will be more uniform, glare will be reduced, and the outage of one lamp will not affect so great an area.

### Rag Sorting and Cutting

The greater portion of the work occupies but a very limited portion of the room area, in fact, frequently only the space adjacent to the walls. It is, therefore, obviously uneconomical to illuminate the entire room to the comparatively high intensity desired for the close operations of sorting. A low intensity of general overhead lighting should, of course, be provided for the entire area of the room.

This can be satisfactorily effected by the use of about one-third watt per square foot, usually with lamps of 75 or 100 watts and a spacing of 15 to 18 feet.

Special lighting is desirable for the sorting and cutting benches. By this is not meant the commonly accepted term of local lighting with lamps, either with or without reflectors mounted close to the work, but rather a modification of general lighting. It is in many cases very desirable to provide a lamp for each operator, but it should be mounted considerably above the work and equipped with a reflector to shield it from view. A commendable practice is to install a 75 or 100-watt lamp over each bench mounted seven or eight feet above the floor and equipped with a deep bowl porcelain enameled reflector.

## Washers and Beaters

Usually these machines are located in rooms of considerable extent, and the illumination requirements do not vary materially over the entire area. For this reason there is no better solution for these rooms than the use of straight general illumination. Since the work is important, a high intensity should be provided which will eliminate also the dark gloomy atmosphere often found in beater rooms, and encourage neatness and cleanliness. Approximately one watt per square foot is ample for these requirements. The ceilings may be low or high, altho the tendency is toward the latter in the newer mills. With low ceilings it is not advisable to use lamps of a greater size than 200-watt with a spacing of 14 to 15 feet, and 100 or 150-watt lamps with a closer spacing are much to be preferred, since glare will be reduced and shadows from the higher portions of the machines will be lessened. With greater ceiling heights, it is possible, though not necessary, to go to the use of larger sizes of lamps without reducing the quality of the installation and with the incident lower costs of installation and maintenance.

## Paper Machine Rooms

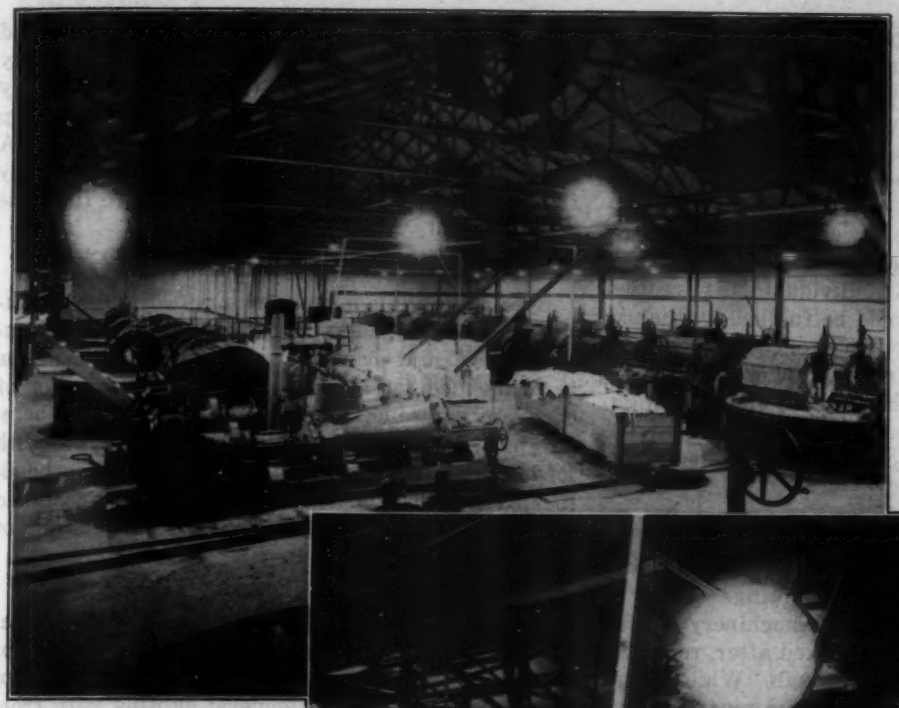
Here again overhead lighting is to be desired, but the location of the lighting units is dependent upon the location of the machines. Lamps directly above any portion of the machine should be avoided, as the accidental breakage of any lamp or reflector so located might mean the loss of many dollars' worth of paper. Usually the machines are so arranged that rows of lamps between the outside of the machines and the walls, and an additional row over each aisle between machines, will prove to be the most satisfactory arrangement. It is, of course, possible and in a measure justifiable to provide a uniform intensity throughout the room, which is sufficiently high to take care of the important operations at the two ends of the machine. This provision will require but little greater wattage expenditure, will result in a better appearing installation, and will provide better for the inspection of the entire length of the machine. This higher intensity in the central portion of the room will also eliminate the need of portable lamps or special lighting for viewing the felt, paper, and rolls, providing that the lower portion of the wall adjacent to the machine is painted white. The light will then be reflected between the rolls sufficiently for their inspection, without the annoyance and glare incident to the use of additional lighting units mounted low upon the wall.

It is important that a high intensity of illumination be provided over the wet end of the machine. At least one, and preferably one and one-half, watts per square foot of floor area should be installed where white or light colored papers are manufactured, and from one and one-half to two watts per square foot for paper of a darker tone. The ceiling heights usually found will admit of the use of lamps of 300 watts and up, spaced from 17 to 20 feet apart. In the few cases where a low ceiling is found, smaller lamps and a closer spacing should always be utilized.

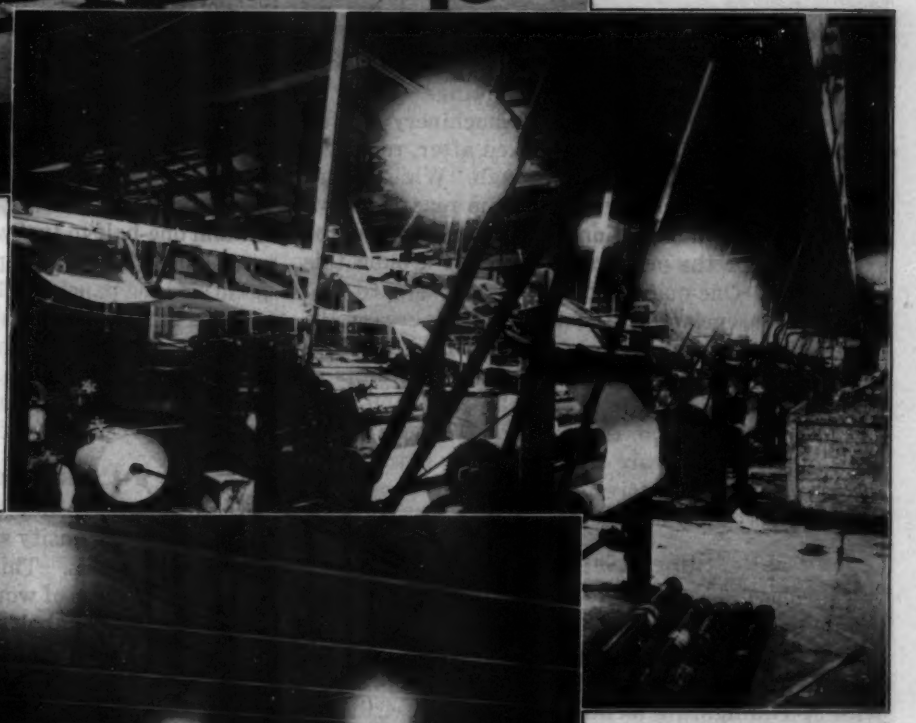
*It is an important safety measure to provide sufficient illumination in the basements below the beaters and machines that these portions may be traversed without danger*

## Machine Calenders

At the other end of the machine, the calenders should be illuminated to even a higher intensity either by the use of larger lamps or a closer spacing of units. Where overhead lighting alone is relied upon for this purpose, the lamps should always be frosted or provided with some sort of diffusing medium so that an objectionable reflection of the bright lamp filament will not be obtained from the calendered paper and the brightly polished rolls. Often the superintendent of the plant prefers to install special lighting units instead of additional overhead lighting to obtain the high intensity needed at this location. There is no objection to this practice providing that such special units shield and diffuse the light suffi-



*The uniform distribution of light and pleasing effect in this beater room is obtained with overhead general lighting, utilizing 100-watt Mazda C lamps and bowl-enameled steel reflectors*



*Paper coating machines illuminated very satisfactorily by means of overhead general illumination only*

*A well lighted rag room, with low intensity of general illumination, and additional lighting over the sorting and cutting benches*

ciently to prevent both objectionable direct glare and bright reflected images. For this purpose it is possible to use either a trough reflector or individual units both back and in front of the calender. If a trough reflector is employed it should be deep enough to completely hide the light source from direct view, and should either have its opening fitted with a diffusing glass plate or else be equipped with bowl-frosted lamps, or preferably lamps equipped with metal or opal glass caps. If individual units are used the same requirements should be fulfilled by the use of either RLM Standard dome reflectors and opal glass caps, or else units of the Reflecto-Cap type. Whatever the equipment, the intensity should be high, such, for instance, as would be obtained from the installation of 100 watts for every foot of the length of the calender rolls.

## Basements Under Beaters and Machines

The infrequent use of these portions of the mill leads to almost universal poor lighting. There is always a considerable amount of machinery located in these areas, which must be looked after, repaired, and avoided by those passing through. While a high intensity is not necessary, yet for the reasons above cited sufficient illumination should be provided for safety and for the ordinary work done around this machinery. One-quarter of a watt per square foot in these basements will not greatly increase the installation or maintenance cost, and will prove ample for the requirements mentioned. Lighting units of comparatively small size, preferably 75 or 50-watt, should be mounted at the ceiling. The characteristics of these rooms are usually such as not to allow the use of uniform spacing of outlets, but they should be located as evenly as possible.

## Super-Calendering

This operation is usually carried on in a room also devoted to other activities. The general lighting sufficient for this other work will not as a rule be sufficient for the calenders. They should be provided with special lighting identical with that described in detail above for the calenders of the paper machines.

## Coating

All of the operations connected with the coating of paper can be satisfactorily illuminated with a straight overhead system of general lighting. An intensity of the order of that obtained by the use of one watt per square foot of floor area is desirable. Care should be taken to avoid the use of lamps of such a large size that with their consequent wide spacing they will produce troublesome shadows. The 75, 100, and 150-watt units will be found to be best suited to these portions. The glossy surfaces found in this work make it very necessary to reduce the brilliance of the light source by bowl-frosting, or, better yet, by the use of opal glass caps or reflecting units. For the illumination of the aisles between the drying racks, bare lamps on drop cords mounted about six feet above the floor can be satisfactorily employed, since the light must be thrown horizontally onto the paper. The 50-watt White MAZDA lamp is well adapted to this location. If smaller MAZDA B lamps are used, they should always be completely frosted or etched, so as to reduce the glare from the lamp filament.

## Rewinding and Slitters

Special lighting is unnecessary for these operations, but a high quality, good intensity light is essential. A general overhead system such as has been recommended for a great deal of the remainder of the plant is also adaptable to the requirements here. Lamps of from 100 watts to 200 watts equipped with RLM Standard dome reflectors and either bowl-frosted or with an opal glass cap should be so installed as to provide approximately one watt per square foot of floor area.

## Inspection

Inspection requires a higher intensity of illumination, but otherwise does not differ from the rest of the work. Where the operation of inspection occupies a considerable area, general lighting with from one and one-half to two watts per square foot of floor area should be used, depending upon the color and quality of the paper. Where this work is confined to benches or tables, special lighting will in most cases prove more economical, with a 100 or 150-watt lamp equipped with opal glass cap and RLM Standard reflector, mounted about seven feet above the floor above each operator's bench or table.

## Packing and Shipping

It is only necessary to provide a fairly uniform lighting of an intensity sufficient for the easy reading of tags and labels. This will also provide satisfactorily for the class of work carried on. General lighting with about one-half watt per square foot of floor area should be employed.

## Miscellaneous

There are many operations around a paper mill which are not peculiar to the paper industry, and they are so many and varied that it is impossible to deal with each individually in an article such as this. If, in such cases, the plant superintendent or engineer will follow the general principles laid down in this and the preceding articles, he should experience no difficulty in working out a satisfactory lighting installation for any portion of his plant.

High intensity, high quality illumination is not a luxury which only the few can afford, but it is the common sense results born from years of experience in industrial illumination. As a means of increasing production, decreasing spoilage, eliminating accidents, improving working conditions, and bettering morale, no better or more economical means can be found than the provision of good illumination.

*Reflected glare from polished calender rolls can be eliminated by frosting the lamps or by using metal diffusing caps*

*Calender end of a well lighted machine room. The additonal intensity of illumination for the calenders is here provided by increasing the number of overhead lighting units at this point*

# A Standard Quality of Chip Board

By HENRY BERT
Chairman, Box Board Committee

*This paper was presented at the meeting of the Northwestern Division of the American Pulp and Paper Mill Superintendents' Association on October 4 at Wausau, Wis.*

WHILE the title of my address is really a misnomer, as there is no such thing as a standard quality chip board, it is my endeavor to review the possibilities and point out the various problems that have prevented it from becoming possible, also to discuss measures whereby these various problems may be overcome in order that the production of a board that can be accepted as the standard of quality may be manufactured and sold at a profit.

There are two very important obstacles in the manufacture of chip board, that prevent the Standard of Quality for chip board from becoming a reality, namely the lack of a standard pack of mixed papers for its manufacture and the lack of standard methods for treating raw material.

## Raw Material

The nature of the raw material used in chip board manufacture, consisting of every conceivable kind of old paper stock that cannot be made to meet the requirements of other grades, would be a difficult enough problem to work out, but, with the "improved" methods by the large packers in the United States, it is impossible to get a packing of mixed paper that will run with sufficient uniformity and cleanliness to be taken as a standard. Therefore, if the mills do not bring enough influence to bear upon the packers for a standard pack of mixed papers and continue to use the ordinary run of stock, it is impossible for them to produce a Standard Quality Chip Board.

If the packers cannot be made to change their present day practices and give the mills a uniformly clean pack, the only alternative for the mill is to install cleaning and sorting equipment. An installation of this character will be an excellent investment, the benefits derived therefrom, such as increased production, uniformity of quality, lower power consumption, savings in upkeep, increased life of your equipment and saving in labor, will be all out of proportion to the amount necessary for its installation and maintenance.

## Processes

The second obstacle is the various antiquated processes used in a large number of mills. These processes are based upon the erroneous idea that the stock has to be beaten and ground to a shorter length of fibre in order to produce a good chip board. This assumption is contrary to fact, that the raw material is old papers, the fibres of which have already been beaten and cut to the necessary length to make papers that are much thinner and of a much higher grade than chip board. Keeping this fact in mind, it is readily appreciated that these fibres, suspended in water, without any change in either length or hydration, will give the most satisfactory results in the finished product. If we could consider all the old papers as being available for the manufacture of chip board, it would then be a comparatively simple matter to produce a standard board, but with the improved methods now being used by the different large packers of paper stock in the United States, it is impossible to get a packing of mixed papers that could be classed as a standard. Therefore, no mill is apt to succeed in producing a standard quality of chip board if it gets its mixed papers from the packers.

## Mixed Paper Stock

There are some exceptional instances where a mill has been sufficiently fortunate to control a direct source of supply that delivers a fairly uniform grade. This enables the mill to produce a very satisfactory chip board with some uniformity. These, of course, are a very small percentage. The majority of mills are not so situated, and purchase their raw material from the packing houses in the open market and in large tonnage. This stock that is ordinarily used in these mills consists of most everything in the form of paper and many other substances that even with a considerably strong imagination could not be classed as paper making material, such as tin cans, rubber boots, old shoes, discarded corsets, horseshoes, nails, and in fact most everything imaginable, that does not occupy too much space is to be found in the mixed papers as received at the mill.

## Source of Supply

The paper stock dealers receive their supply from many different sources such as office building, printing, publishing and lithographing houses, paper box and millinery factories and from the collector or push-cart man, to whom the collecting of paper is only a side line, as he also collects every kind of junk that may come his way. It is readily seen that the waste paper as received at the paper stock packing house is not going to be a bunch of American Beauty Roses; furthermore, when we take into consideration that it is bought by weight and "as is" that there will be a considerable proportion of substances that give

weight but have little else in common with paper.

The accepted practice at this time in the packing houses is to dump these collections onto a conveyor belt without dusting or screening out the sweepings, etc. Spaced at intervals along this conveyor are the sorters, who pick out the choice stock, such as kraft, clean manila, ledger, book, bond, printed manila, newspapers, magazines, strings and rags, as these are packed for making better grades of paper and bring a higher price. What is left on the conveyor goes to the baling press to be sold as mixed papers for the manufacture of chip board, and consists principally of broken boxes, trimmings from box factories and rubbish of every description.

## Dusting and Screening Discontinued

Some years ago it became the practice of all paper stock dealers when packing for the mills to pass the stock through dusters and over screens. This operation removed the dust, sweepings, iron and glass up to one and one-fourth inches in diameter, the larger pieces being removed by hand, but during the last four or five years they have discontinued the use of the duster and no longer have sorters to remove the rubbish. The consequence is that while all the best or cream of the waste paper is removed as before and diverted into other higher priced grades, the dirt and rubbish goes into the mixed papers, making this grade even of a lower quality than it ever was before.

It is surprising to know the difference in the cost of production, when using absolutely clean mixed papers, as against the ordinary run of mixed papers from the paper stock dealers that is being sold at the present time. True, you do get some occasional shipments of good clean stock, but the very next carload may be extremely inferior and very dirty. How, then, can you possibly expect to duplicate an order of chip board as to quality or even quantity when your raw material varies so radically?

## Decreased Production

When duplicating an order of chip board, if you find that you are running from five hundred to one thousand pounds less board per hour than you did on the previous order, you will find that the answer ninety-nine times out of a hundred is in the difference in grade and cleanliness of the mixed papers you are using. The stock used in your first order perhaps may have had a very small amount of old newspaper stock and ran comparatively clean, while the stock in the second instance consisted to a large extent of old newspapers and ran dirty. You have, therefore, been compelled to grind the second lot considerably harder in order to disintegrate the small sticks, excelsior and other foreign matter that never was intended to be used as paper making material. When this is run on the paper machine, the stock is much closer than ordinarily, which causes it to crush on the cylinders and dry much harder on the dryers, both of which are responsible for your large shrinkage.

## Increased Coal Consumption

Low grade and dirty stock does not only cut down your production in the machine room, but is a very important factor in your coal consumption. I have some actual figures available that will illustrate this fact to you very forcibly. The coal consumption figures were taken for one week in a mill making chip board from very dirty paper stock or what is generally known as original run mixed papers, the average result for the week being 1,750 pounds of coal to 2,000 pounds of chip board. With the same grade of stock, after being properly cleaned at the mill and run with the same equipment, the average result for the week's run was 1,250 pounds of coal to 2,000 pounds of chip board, and an increase in production of 33 1-3 per cent. These figures may seem to be somewhat exaggerated to some of you and perhaps you may have some doubts, but I can assure you that there are several mills to my knowledge who for the last year have produced a ton of chip board for every 1,250 pounds of coal. This was not an experiment carried out under ideal conditions for a period of time or run, but under the regular practical operating conditions for an extended period of time and proves conclusively the saving in power consumption by the use of mixed papers that have been cleaned properly as against the use of the original run of mixed papers in the manufacture of chip board.

## Maintenance

Upkeep, in other words, the wear, tear, and longevity of your machines and machine parts, is a very important item in your cost figures that will be considerably lessened by the use of cleaned stock. By its use it is possible for you to run your machine twice as long without a wash-up than when you are using original run stock and increase considerably the life of your cylinders, felts, jackets, beaters, jordans, screens and pumps. The increased efficiency gained being fully 100 per cent. In the case of felts you will be able to get over 100 per cent more tonnage from each felt. A bottom or top felt that has been giving you four weeks' service will give you eight weeks' service without any trouble in addition to the increased tonnage. Cylinders and jackets are benefited in the same proportions. If you examine your beater, you will find the beater bars and bed plates have all been battered, have a wire edge, and that the cutting edge or face of the bars has been considerably widened, almost twice as wide as they should be to give you the proper grinding contact. This condition increases the power consumption, as the wider the bars the greater the amount of power consumption that is required to drive your beater. The same thing applies to your jordans. The cause of this condition in your beaters and jordans is the

pieces of wood, tin cans, matches, nails, bolts, and other metallic objects.

If you are running clean stock, your screen plates can run a year or more before there is sufficient wear to warrant their being recut, while in the case of ordinary stock it will be necessary for you to have them recut every four, six, or at least every eight months. With your pumps, you will be unable to get real efficiency until you use clean stock and prevent the clogging from sticks, rags, strings, and other foreign matter that comes with ordinary run stock.

## Labor

The saving in labor will be an item worth while, as you will only need to carry half of your present repair force and considerably lessen your beater room force, due to the fact that with the clean paper, the men can dump it directly into the beaters without the loss of time necessary to pick out all the larger pieces of foreign matter that is present in ordinary run papers, which would cause serious damage to the beaters, and as a rule requires three or four men to fill the beaters. This is too slow a process and prevents you from maintaining your equipment up to its maximum capacity. With clean stock, treated along certain lines, which I will subsequently cover, you can take an empty 1,500 pound beater, fill it with water and stock and have it ready to dump in an hour.

## Conveyor Method of Sorting Stock

There are many various methods by which you may remove practically all of the foreign matter, and they all have some good points in their favor. The best method that I have seen worked out which appeals to me as being the most practical is as follows:

After the bale is broken open, lead the stock directly into a duster, the outlet of which will be directly on to a conveyor belt, divide your force of sorters equally on either side of the conveyor, one side to remove all the foreign substances and the other side to pick out whatever good stock it may contain, that you may be able to use to advantage in a higher grade of board; the conveyor should then lead the stock into a second duster, with a screen sufficiently large to permit the removal of all the small pieces of metals such as nuts, nails, bolts, etc., and any pieces of glass that might be present.

## Increased Efficiency

If you install an equipment of this character for the preliminary treatment of your stock, you will be able to run your equipment at its maximum efficiency, at the same time increase your production from 15 per cent to 35 per cent over your present tonnage with a considerable saving in power and labor and the reduction of your upkeep by one-half.

The question as to whether it will pay a mill to bale and handle the various grades sorted out depends entirely upon whether the stock as received by the mill contains a large percentage of high grade stock. If so, it will pay the mill to sort, bale, and handle just as much as it does the paper stock dealer, but if the mill runs only chip board and the paper has only a small percentage of high grade stock, it will not pay to sort the stock; the cleaning and dusting operations are all that is necessary.

## The Use of Hot Water

The properly cleaned stock should be placed into the beater with water that is maintained at a temperature of not less than 170° F. When the beater is filled at this temperature, the water is hot enough to dissolve the sizing on even the hard sized papers and considerably lessens the possibility of pieces from any parchment or waxed paper that might be present being visible in your finished product, as the parchment will be soft enough so that after you let your beater roll down on it and pass it through the jordan, it will be disintegrated to such an extent that it will not be possible to detect it, and as the paraffine from the wax paper will dissolve at that temperature, it will leave the fibres and be distributed throughout the stock, removing the possibility of the finished product showing any evidence of wax being present.

When you have filled the beater at this temperature, it is simply a question of a light brushing with the roll to make this stock available for good chip board. You must remember that this stock was beaten before to make a paper that was much thinner, lighter and stronger than the product to which you are going to convert it. All that is necessary is that the fibres be separated and suspended in water. They do not have to be ground to reduce their length, nor do they have to be beaten to an imitation parchment; it simply wants to be dissolved to make it available for your purpose. As the method of using water at a temperature of 170° F. gives the desired result with the smallest amount of time, labor and power consumption, it is the only logical method to use. By its adoption you will be enabled to fill a 1,500 pound beater and have it ready to dump in one hour.

## Beater Roll Filling

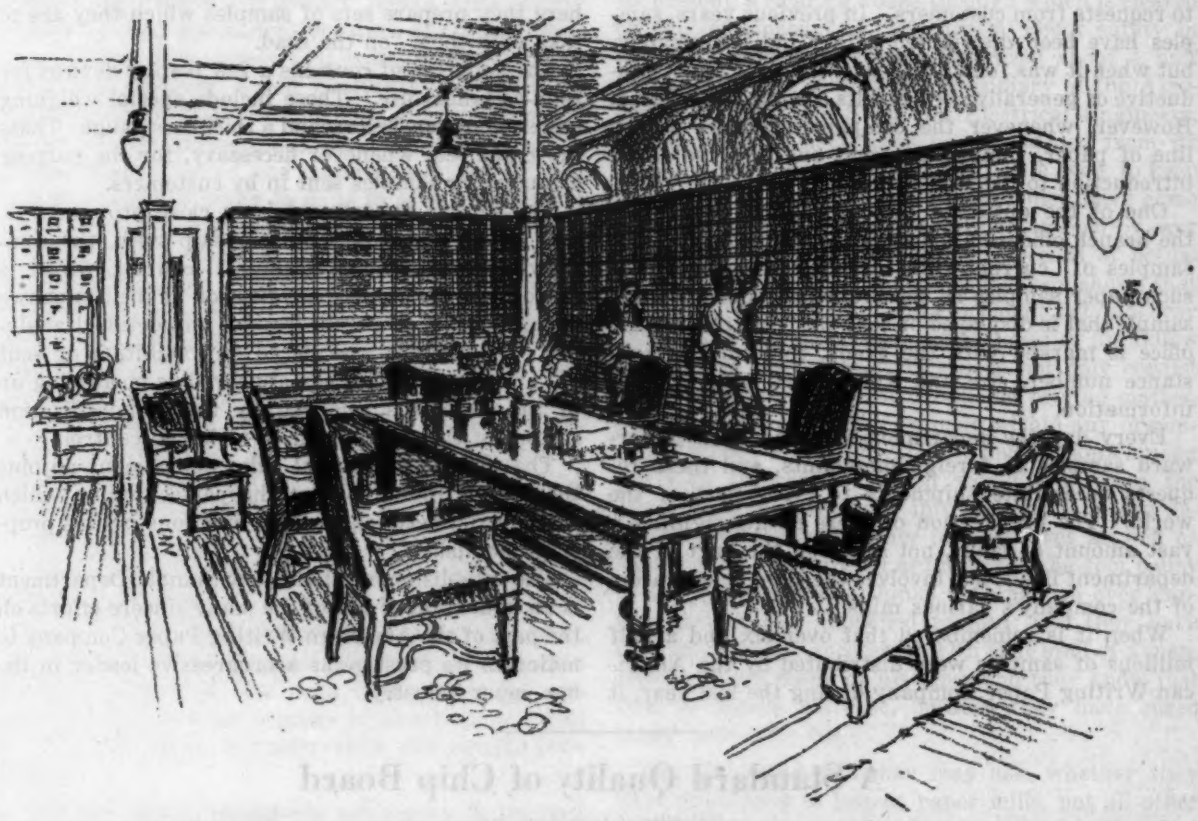
You may advance the argument that the hot water is detrimental to the wood filling in the beater roll. It is true that the wood does not last as long in the roll where hot water is used as it does where the water is not heated, but you can well afford to tear this beater roll filling out every twelve or eighteen months and refill your rolls. You will then get better circulation in the heater, and it will do much more consistent work than by letting it go until it is compulsory to make the change. Simply because the beater is sticking together and your beater roll is going around does not signify that it is giving you 100 per cent efficiency. When you begin to lose the efficiency of your beater, which on this grade of stock

*(Continued on page 508)*

# The American Writing Paper Company's New Paper Sample Exhibit

By ALBERT HIGHTON

WHAT is considered by all those who have inspected it as the finest paper sample room in existence has just been completed by the American Writing Paper Company. The new Paper Sample Exhibit, by which title the company prefers to designate it, is conveniently housed on the ground floor of its general office at Holyoke, Mass. It is thus in close touch with the company's sales department, its Holyoke mills, the department of technical control, the research laboratory, and the large new developmental and experimental division.



The new department is of spacious dimensions, its area being 1,200 feet. Its dignified decorations of ceiling and walls, the artistic draping of the windows, the effective arrangement of its cabinets and other furnishings, and its spaciousness combine to make it a fitting place for the display of "Eagle A" products and for the reception of customers. The handsome room is intended also for conferences and for the convenience of buyers and others who visit the office. Its business-like arrangement is compact, distinctly pleasing, and the samples can be handled with facility. Moreover, the essential feature for the proper examination of paper—perfect lighting—is ideally assured. The up-to-date "daylight lamps" installed by lighting specialists are a notable feature in this connection.

The older sample department had been established only two and a half years, and though it served its purpose as well as could be expected under the circumstances, it was long considered as antiquated for a progressive concern of the magnitude of the A. W. P. Co. The system of centralized distribution which it employed, however, was decidedly better than the roundabout method which preceded it—that of sending out samples to customers direct from the mills.

The present exhibit contains over 5,000 carefully classified sets of samples of "Eagle A" papers from the 26 mills. Almost every grade of paper, with the exception of coated, tissue, and newsprint, is on exhibition. The samples are therefore fully repre-

sentative of the company's products. Special lines, such as industrial or technical papers, are, of course, included.

All who are interested in paper for commercial and industrial uses will find in the new Paper Sample Exhibit Hall an unparalleled collection of these samples. These will prove a valuable aid in solving prospective buyers' various problems efficiently and advantageously.

The samples, which are contained in the 1,100 trays, or drawers, of the cabinets, are methodically arranged so that any particular paper can be found and inspected, when necessary, in an instant. In addition to the storing of this collection, samples are made up in this department to send out in response to requests from customers. In previous years, samples have been distributed rather indiscriminately, but when it was found that such a plan was not productive of generally good results, the practice ceased. However, whenever the company produces a new line of paper, samples are sent out to serve as an introduction to listed customers.

One of the duties of this department is to keep the branch offices of the company well stocked with samples of current runs of paper, and to replace such paper samples as the branches require. Each sample that is displayed or sent out from the general office is marked with the grade, color, finish, substance number, size and weight, and other special information.

Every day the department is called upon to forward samples to foreign merchants, and these requests necessitate shipments to every part of the world. The preparation of these outfits signifies a vast amount of labor, not alone on the part of the department itself, but involves the close co-operation of the company's various mills.

When it is remembered that over six and a half millions of samples were distributed by the American Writing Paper Company during the last year, it is evident that considerable work devolved upon the sample department. The work of the department is in charge of Mr. J. A. Snyder, who frequently requires the assistance of three or four others to accomplish effectively the objects of the department. Mr. Snyder has been with the company for the last two and a half years. He has worked in the mills and mill offices and has had considerable laboratory experience. He is thoroughly familiar with all of the company's products.

In the sample room, the new salesmen, the personnel of which the company is constantly increasing to handle its growing business, acquire their preliminary knowledge of the "Eagle A" products. Here they become familiar with the various grades, and here they prepare sets of samples which they are to take with them "on the road."

The department contains a few testing devices for semi-technical use. These include special weighing scales, a Mullen Tester, and a thickness gauge. These are employed, whenever necessary, for the purpose of matching samples sent in by customers.

The sample department is in close proximity to, and enjoys the closest relationship with, the company's department of technical control, which is responsible for the standardization of the company's papers and all research, testing, and detailed analyses. No samples are placed on exhibition or sent out unless they have been approved as measuring up to the standards required by the standardization section of the department of technical control.

The company's general sales department adjoins the sample room, so that the perfect union which should exist between the two functions is thus properly established.

The establishment of the new Sample Department is an indication of one of the many sincere efforts on the part of the American Writing Paper Company to maintain its prestige as a progressive leader in the fine paper industry.

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## A Standard Quality of Chip Board

(*Continued from page 506*)

will be from twelve to eighteen months, you want to get busy immediately and take it down and overhaul it. Dismantle your beater roll and refill it, babbit the bearings, and you will be ready to start out with a practically new beater. Take the old iron filling and have it rerolled and put into shape for future use.

If you are not working with clean stock, you are putting out on the market an inferior grade of chip board and helping to demoralize your own industry, which even under the best of conditions is very difficult to make a paying proposition.

Just try out this program for a while and you will be surprised how easy it is to maintain a uniform quality of board at a much lower cost and a much larger production. This will keep your employer satisfied and prevent him from asking you many "fool" questions about how you are conducting your work, for he never does that except when he is dissatisfied with the methods you are using and the results you are producing.

Let us all work together and produce a *Standard Chip Board*, and then let us keep up at all times the standard that we have set for ourselves, for there is no danger of your producing too good a board, as there is nothing under the sun that can be made too good, and chip board is like everything else at the present time—it has lots of room for improvement, also, let us all endeavor to make the paper stock dealers furnish us with a Standard Grade of Mixed Papers.

# Safety First

By G. H. GREGORY

THE most important thing in the world today is "HUMAN RELATIONS." Much is being written and more said about reconstruction, but Mr. Frank Vanderlip certainly said it all when he laid down the principle the other day that, that nation which firmly established good relations between employer and employee, would be far in the lead of all other nations.

Of course we all know that in the slogan, "Safety First," the "First" primarily means that safety should be first given consideration and speed, etc., afterwards. Now safety first is but a factor in this great big problem which confronts the world of bringing about good relations between employer and employee. In this most important of all work, safety is the biggest factor and consequently the "First" factor. The first thing to do is to save a man's life and after that may well come whatever else you may want to do for him to make the life you have conserved pleasant, whether it be picture galleries or picnics. In the quite bulky pamphlet the largest employer, the United States Steel Corporation, publishes about its welfare work, embracing many lines of activity, the first heading is "Safety." This is true of all others, and it is well to remember that in beginning with Safety we are entering upon the biggest thing in the world, and are seizing the biggest thing "First," that is "Safety."

The paper mill owner may say, "Yes, I know, those railroad switch yards are certainly terrible places for slaughtering men, and something ought to be done about it." Well, the manager of a certain pulp mill down in New England has confessed in open meeting that with less than twelve hundred employees, they have an average of about one accident a day, and this is in conservative and careful New England.

That old adage, "Accidents will happen in the best regulated families," has certainly not served the world well. It insinuates a certain fatalism in human life which it is useless to try to dodge or prevent. Now this is all wrong. It has been proven and proven up to the hilt that remedial measures have reduced the accident list enormously and given the lie to the old adage, but to get to know and apply these "safeguards," not "remedies" (lock the stable door before the horse is stolen), a man must have that mental attitude to the subject that will permit him to profit by the experience of others, and listen to what others say who have had the things happen to them that he would avoid in his own case. There is a type of mind that rejects everything from the outside as "bunk" and especially anything in print.

As this is the attitude of some excessively "practical" men towards even the trade press, we will digress a little to analyze this matter a little later on, but first let us introduce you to a "Safety First" organization which may have the honor of sharing somewhat this charge from the man very proud of his self derived intelligence.

The National Safety Council, to give it its present name first, is, as to its past, an evolution, and, as to its present, a clearing house through which is cleared all the information in this country about safety in industrial matters. It was organized about a half dozen years ago, at first as a subsidiary of the Association of Iron and Steel and Electrical Engineers, and its field of usefulness has broadened from its birth, and it has twice changed its title even, to keep abreast with the important duties which have come to it. At present its bulletins are being read by over six million workmen, and it has a record of actual performance behind it which conclusively shows that it has cut down the appalling accident list in a way that should commend it to every lover of his fellow man in the land. Its service does not only consist in the weekly issuance of invaluable printed matter, but it has a system of organizing within any organization a body of safety watchers and workers among the men themselves, which would transform the most reckless dare-devils into citizens who are decently considerate of other peoples' lives as well as their own. They are an antidote for the fool policy of the workman who thinks nothing can ever happen until it has happened to him; and they have been particularly successful with that kind of a man, and there are many of his kind, and they know just how to handle his case, because they have cured many cases like his.

But the paper mill man may ask, whether they have something to benefit paper mills, not all other kinds of hazardous risks, but just paper mills, that is what he is interested in.

Well, let us enumerate a few kinds of happenings they have run up against:

In the wood yard, in unloading from flat cars, accidents have occurred from the cars not being supplied with side stakes; with box cars, men have slipped off the gang plank, because it had no cleats; locomotive crane unloading of logs has caused accidents, and a whole lot of accidents have come from not keeping the tracks clear of the wood; the chain conveyor handling logs has claimed its victims due to bad arrangements, and the cradle grab bucket can be handled wrong too.

In the block pile, blocks have thawed out from

Bulletins Are Read by 4,500,000 Workmen Each Week
NATIONAL SAFETY COUNCIL, Chicago, U.S.

# THE ROUGH MOTORMAN

*He steps on the "juice," he steps on the air,*
*He heeds not the stress of the straphanger there.*

If his passengers could have their wish, the "rough" motorman's sleep would be continually haunted by the spectre of his misdeeds.

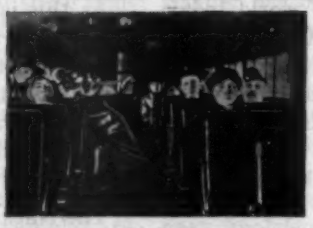
## He Shakes Up Their Bones at Every Start and Stop of the Car

Many accidents are charged up to him—aged and infirm people, women and children are thrown and sometimes seriously injured.

## Don't Join the Rough Motorman's Class
## Start and Stop Your Car Smoothly and Easily

Bulletins Are Read by 3,500,000 Workmen Each Week
NATIONAL SAFETY COUNCIL, Chicago, U.S.

# Air Brakes Break Bones



## The Improper Application of the Air Brake Frequently Causes Accidents to Passengers

Many injuries to passengers result from this cause—each of them the result of Carelessness or Thoughtlessness on the part of the engineman. Especial care should be exercised when operating engines of steel pipes, water tanks and car sheds.

It is not enough to be Careful in doing big things—the little things often result in fractured bones.

Bulletins Are Read by 4,500,000 Workmen Each Week
NATIONAL SAFETY COUNCIL, Chicago, U.S.

# THE SPEED MANIAC

## His Creed—Save a Second Whatever the Cost

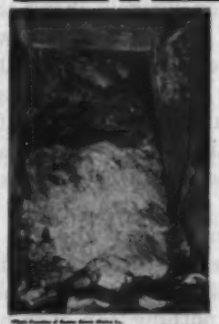
Collisions between street cars and automobiles are increasing at an alarming rate but investigation shows that nearly always the fault lies with the drivers and not with the trainmen. The streetcar company is not liable, but all such cases are more or less troublesome and expensive. More than that

## TOO MANY LIVES ARE ENDANGERED

Do More Than Your Share—Keep An Eye Open
At All Street Intersections for the Reckless Driver
Avoid Accidents—It Helps Your Record

Bulletins Are Read by 4,500,000 Workmen Each Week
NATIONAL SAFETY COUNCIL, Chicago, U.S.

# WORKING IN DANGEROUS GROUND



HAM DANIELS of the Copper Queen Mine was standing on a number of round iron bars loosened by the night shift. When he started to work he picked down the bank, but the round had broken through the quartz material in which the drift had been driven, pulling into it. After a while this commenced to slide. Outside noticed some fine stuff from the roof but before he could get back under the set a slab fell, striking him in such a manner as to dislocate his hip. James Cook was about twenty feet away and soon rolled the slab from Daniels' leg, pulling him back under the sets. (A) of the ground shown in the picture did not fall at this time.)

*The injury was a severe one and will lay him up for some time. The curious exhibit contained the first old drawings and may be seen at the bottom of the picture.*

THE LESSON TO BE LEARNED FROM THIS ACCIDENT IS THIS:

Bulletins Are Read by 3,500,000 Workmen Each Week
NATIONAL SAFETY COUNCIL, Chicago, U.S.

# THIS MUST STOP!

## The Rules Prohibit Men Going Between Moving Cars or Engines to Couple or Uncouple Same

But men continue to take such desperate chances with the expected result.

Why not stop this dangerous practice before you lose your life or limb?

Twenty-four men killed and two hundred and fifty injured trying to do this during year ending June 30, 1915.

NATIONAL SAFETY COUNCIL

# Falling Piles of Material Cause Many Injuries

In piling brick, cement, lumber, steel or other material—

1. See that pile rests on a solid foundation.
2. Don't let face of pile overhang—rather let it slope back a little.
3. When taking away, keep pile always in safe condition—don't take away from bottom.
4. Don't overload floors or scaffolds.

# PILE CAREFULLY

Bulletins Are Read by 4,500,000 Workmen Each Week
NATIONAL SAFETY COUNCIL, Chicago, U.S.

# Always Block the Bumper

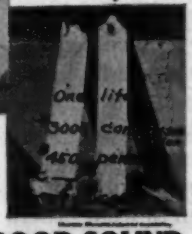
The Bumper on kick-off table had worked loose from key and John Lotze, a Rigger in the Blooming Mill, was putting a cable sling around same to raise it up when it fell on his foot.

## He should have blocked up the Bumper before putting on the sling

NATIONAL SAFETY COUNCIL

# SCAFFOLD FALLS

Why?
Knot in lower board of bracket
Brackets too far apart



The employer lost the compensation
The workman lost his life

## USE ONLY GOOD SOUND LUMBER for SCAFFOLDS

Bulletins Are Read by 4,500,000 Workmen Each Week
NATIONAL SAFETY COUNCIL, Chicago, U.S.

# Hand Caught In Sling

John Kaworowski, a Rigger's Helper in the Structural Mill, with his partner, was building up roll stand which contained three rolls.

The middle roll was put in place and craneman was given signal to hoist cable sling to get another roll, and while craneman was hoisting, he held onto sling to be raised up to the top of roll housing. The sling caught on a bolt on side of roll housing, catching his hand.

Do not ride on any load which is being carried by overhead cranes

the frozen mass and caused trouble, and to loosen with dynamite or by means of dragging means, knowing how to do it with safety.

In the Log Conveyor and slasher mill a half dozen kinds of accidents have been experienced.

The Wood room is credited with seven different kinds of casualties.

Sulphite mills seem to be particularly subject to accidents of various kinds and sixteen different styles of trouble have arisen, while the Soda Process is similar and may have the same kind of accidents, with the added risk from the concentrated caustic soda which causes severe burns.

Most accidents in Ground Wood Mills result from slippery floors and insufficient illumination.

In the Rag room, there are few mechanical accidents, but sanitation and ventilation must be looked out for in order to prevent employees from contracting diseases from the rags.

Many accidents occur in the Beater room.

The Machine room is a whole plant in itself and the things that can occur here are too numerous to mention.

All calendering and Winding machinery can give rise to accidents of a most terrible kind.

The Finishing room has its dangers similar to the last.

But it must be ever remembered that the pulp or paper mill is much more than what is enumerated above. This industry is said to be the second largest user of steam in existence, and that means that all the mishaps that may come to a modern industrial plant of any sort, confront the paper mill owner. Danger lurks everywhere from the car on the track from which raw material is being unloaded to the car on the other track into which the big white rolls of paper are being loaded for outgoing shipment.

But the doubting Thomas, the critic to whom we shortly referred, may say that he knows as much about this part of the business as any one else, and does not need outside help. Now let us see clearly that an accident is something that comes unwelcomed, it is not sought, it is not practiced, it is not experimented with. It just comes along and hits you and there you are. You may have kept house many years, very successfully, and been very happy, and yet never had a fire or a murder in the family. You don't want that kind of experience, but if it is thrust upon you the best thing you can do is to tell the other fellow to look out, and tell him how you got yours, and how he may avoid getting his. That is the part that justifies the newspapers in publishing so much of that kind of news.

In this connection we may see that numerous accidents in an industry may affect that industry in more ways than suits for damages, loss of time, general loss of efficiency in breaking in new people, etc. If the people in the town where they had at one mill an accident every day in the year among less than twelve hundred employees, are like the people in other towns, they will say, "Well, if the same person does not get hurt the second time within three years, about the whole bunch of men at that mill will get theirs within those three years, and if I go to work there I can safely bet on my getting mine. Not for me. That employment is too dangerous." It does not pay for any industry to be regarded that way.

The hypercritical say about the trade and the technical press, "How can that bunch of fellows in white collars in those offices tell me anything about my business?" This is not the attitude of the majority, by any means, else the eduactional journal as well as such organizations as this one for safety would be impossible. The plain common sense answer is hardly necessary to give to any one who really knows the facts; if that white collar bunch evolved the information that they impart from their inner consciousness while sitting at their roll top resks dictating to stenographers, then what they give out might be just "bunk."

But the real educational journal, as also the organization for safety, does not make up this information in their offices. They are CLEARING HOUSES of the Special Information belonging to their field, which information comes from the expert source for that particular kind of information, the most expert they can find. It must certainly be an advantage to the operator of any plant to know what is happening and has happened in every similar plant in the country and the remedies and safeguards that have been successfully applied. Take the case of an expert engineer on fireproof construction. He may be sitting at his table in his office, designing a fireproof building, and with the satisfying feeling that he knows nothing about what is or isn't fireproof, but he may suddenly burst into the room from a trip down street, and tell his chief that "the Jones block is burning, yes, sir, the flames are coming right out of the roof," and if the engineer is really wise he will listen to that boy.

We know that you are not like that Englishman who went to a meeting to see Daniel Webster, in England. Now Webster had, as is well known, a very, very wise look on his face. Wisdom was Webster's middle name and was written all over him. At the first glance at Webster's face the Englishman blurted out, "That fellow is a fraud. It is not possible for any human being to be as wise as that man looks." That Englishman himself was about as wise as the farmer who said, when he saw a giraffe for the first time, glancing up and down its long neck, "There ain't no sich animal."

Now if the National Safety Council pretended to know all the valuable things it is daily imparting to the thousands of factories and millions of workmen, it would be placing itself in the class where the Englishmen put Webster and where the farmer put the giraffe, but it makes no such claim as of evolving

all this from its inner self, from its self-derived intelligence. What it is very earnestly and successfully trying to do is to save the next fellow from the fate of the last fellow who may have fallen into a death trap that had never been known as a death trap before. In other words the National Safety Council is the National and I almost might say the International—for there is nothing else like it in the world —CLEARING HOUSE of safety intelligence, which is the first and greatest factor in welfare work. How much further they may develop, the future alone must tell.

The Public Be Damned Period has passed away, never to return, and the man who does not see that is blind indeed, as he who will not see. A paper manufacturer may be sitting in his office, smoking a good after-dinner cigar, and pleasurably surveying a good year of business, and a good year for profits. All is going merrily as a marriage bell. He looks out at his smoking chimneys and thinks how foolish are the people who spend their money on fads, "safety first" and otherwise. Of course he thinks to himself, the amount of money is not so great, but the principle of the thing is wrong, and every dollar counts. He don't propose to let any of his escape on foolishness, no, not HE.

Then someone comes in hurriedly and tells him he is wanted out in the mill, and a call for the doctor should be sent in at once. An accident has occurred out in the plant, the worst by far they have ever had—one man is dead and another may die and a half dozen men have been injured. The owner hurries out and his brain is on fire with thinking, but How Different Are His Thoughts Now.

Is it going to be a big damage suit affair? how many victims are there? can he replace the injured? will he have to shut down? What will the town say, COULD THIS THING HAVE BEEN PREVENTED?

That man is not thinking now of profits. What he is thinking about is this: "Why in the world didn't I get some of that Safety Stuff, anyway." The case would look so much better to all the people, the people to whom he must make answer SOMEWHERE, whether in the court room or in the Forum of Public Opinion. And being a man of imagination as well as of good business sense in the ordinary way, he mutters to himself, "Heavens, if I could only go back to the letter files in the office and get the carbon of a single letter, showing that I had asked about the stuff, that I had taken any interest in the matter, to show that I had had the matter of the safety of the men in mind." He had come across a few days before an unusually strong appeal of what is everywhere in the air, "Safety First" and said to himself, "It wouldn't cost anything to just inquire, I have a half a mind to write and get their dope." But he had not done it. How many are there just like him?

*BE CAREFUL!*

*Do not let your workers overload the trucks. They will accomplish more with safety by taking smaller loads*

# The Cost of Labor Turnover

## The Most Useless and Expensive Item in Your "Overhead"

THE cost of labor turnover to the employer falls into two main divisions:

1. The cost of breaking in a new man for the place. Even though it be not necessary immediately to replace a worker whose employment is discontinued for some reason, a loss is sustained because the number of men which must be broken in later is increased.

2. The limitation placed by the turnover upon the amount which the employer can profitably invest in his workmen and consequently the limitations placed upon the output which the employer can obtain from his workmen.

1. The cost of breaking in a new man consists of the following principal items:

(a) The cost of hiring. This includes employment office expense, cost of medical examination, and of advertisements, pro-rated over the number hired.

(b) The cost of training. This includes the share of the training department's cost and the value of the foreman's or other workman's time spent in instructing the new hand.

(c) The extra labor cost. In case of payment by the piece, this item includes day wages in excess of piece rate earnings paid new operatives during the learning period until they are able to make a fair day's wage at piece work. In case of payment on a time basis this item includes the cost of the time above the normal which the inexperienced worker takes to perform the operation. If it is necessary to hire extra men to make up for the deficiency in production until the new worker attains the normal output, all wages paid these men on a time basis are included in the labor cost of the turnover. If it is necessary on account of the lesser efficiency of the new worker for regular employes to work overtime, all time wages paid them on account of overtime or holiday work and all wages in excess of the regular piece rate or bonus rates paid on account of overtime or holiday work are items in the labor cost of the turnover.

(d) Cost of extra power, lubrication, and materials caused by reduced rate of output. If, because of the reduced rate of output, it is necessary to drive the machinery ten hours to produce an output which at the normal rate could be produced in five, the cost of the power, lubrication, etc., necessary to run the machinery the additional five hours is an item in the cost of breaking in the new workman.

(e) Profits which would have been realized upon orders which, because of the smaller productive capacity during the period before the vacancy is filled and during the period of breaking in the new man, it is impossible to fill.

(f) Interest, depreciation, insurance, taxes, and repairs on additional plant investment necessary because of the lessened output caused by the turnover.

(g) Cost of work spoiled by new operatives in excess of the normal rate of spoilage by workmen experienced in the operation.

(h) Greater wear and tear on machinery. This includes the greater cost of repairs due to breakage and the greater depreciation due to harder usage, caused by the inexperience of the operative, and to the necessity of running machinery a longer period in order to obtain a given output. This item includes extra wear and tear of all kinds on machinery which it would be unnecessary to operate were the normal production maintained on the machinery used by the new hand.

(i) Increased cost of accidents due to greater accident frequency during the learning period. To employers who carry their own risk, this item is of great importance. To employers who receive a reduction of premium rates for a low accident record this item is also of considerable importance. To employers who pay a fixed insurance rate based on the payroll, this item is of less immediate importance. The high accident frequency among green employes greatly increases accident rates, however, and a general reduction in the turnover rate resulting in a lower accident rate would make possible in time a reduction in the cost of accident insurance. The increased accident cost includes not merely the cost due to greater accident frequency among inexperienced men, but also the greater liability to accident due to the fact that the lower productive capacity of the new men requires the employment of a larger number of men.

(j) The loss of good will and business, and the expense of making adjustments and replacements for goods defective because of the greater number of mistakes made by inexperienced workers, and the loss of business and good will and the extra expense caused by the less satisfactory service rendered customers by inexperienced employes.

2. The limitation placed by the turnover upon the training which can be given workmen is a cost which cannot be definitely ascertained and which has been generally neglected in discussions of the cost of the turnover. Nevertheless it is one of the most important of all items of cost. Stability is a fundamental prerequisite to efficiency in the force because efficiency is largely conditioned upon elaborate and

(*Continued on page 515*)

# Testing Physical Properties

By S. W. WIDNEY
MATERIAL TESTING ENGINEER, CHICAGO

NORMAL Thickness, Hardness, and Resilience of any material are three properties, a knowledge of which have an important bearing upon the uses to which they should be put.

The Widney Modulimeter is an instrument for testing these physical properties, and is the result of about five years of development. Its use makes possible the first standard of measurement of physical properties of material used in manufacture.

In working out the thickness gauge we have eliminated all springs, as springs are always variable. We now have a mechanism which gives a gravity pressure which is always constant, and gives the same results under all conditions.

The operation is very simple. We have a standard contact point of 1 cm., and the standard weight pressure we have adopted is 50 grams, which gives us an equivalent equal to 100 lbs. to the square inch when we apply our full load for Hardness tests. The dial gauge registers in .001 of an inch the thickness of any material upon which the foot is resting. This thickness gauge permits of the accurate measurement of Normal Thickness of all Compressible Materials, and is the only one that will give accurate measurements on a very soft material.

It also accurately indicates the variation in thickness of any material. If there are any thick or thin spots it will show them.

Until we worked out this first recognized standard thickness gauge, the measurement of the thickness of Compressible Material was quite confusing, for there were so many methods being used. For instance, one person would measure the thickness of a thick piece of Felt with an ordinary flat roller, another would use a caliper, and another an ordinary micrometer, and another a spring micrometer, which obviously meant different interpretations of the thickness on the same material, and even if the same method were used the results were always variable.

However, now we have a thickness gauge that is always the same, and no matter in whose hands, the readings will always show the same on the same material.

The great trouble with the dial micrometer gauge heretofore was that it contained springs, and these springs themselves were always variable; further, the pressure on the foot on thick material was considerably more than it was on thin material. With our gravity weight the pressure is always the same, regardless of the thickness of the material being tested.

To determine the Hardness of a Compressible Material such as Felt, Rubber, and the like, we apply a standard pressure over a given standard surface by means of these weights, which are attached to the quadrant, which in turn engages this plunger. Releasing the spring catch permits the weights to pull the quadrant back, and the quadrant being attached to the plunger by means of a drum and flat cable, the plunger is forced down onto the pressure foot of the dial gauge, which is resting on the material on which we have just noted the Normal Thickness Reading.

As the weight pressure is applied, the hand on the dial gauge moves backward as the thickness of the material is being reduced. When the full standard load (equal to 100 lbs. per square inch) is applied, we take the thickness reading on the dial gauge. If the material gauged say .100" Normal Thickness and under Widney Standard pressure .050", we say it is 50% Hard—if the thickness has been reduced to .025 it would be 25% Hard, etc. If the material were Glass and there were no depression we would say the material is 100% Hard. Had it been real plastic, like soft putty, and gone down to 0, we say it is 0 Hardness. This is the first standard means of determining and expressing Hardness.

Now you can determine Relative Hardness in your Felts and Rubber and express them in definite figures that are as intelligible as feet and pounds.

To determine the Resilience or "Life" of a material, we apply the load in increments and remove it in successive decrements, plotting the Hysteresis loop and noting the Resilience area, and by computing these two areas geometrically we are able to figure out exactly how much Resilience or "Life" any material possesses.

The meaning of the word "Resilience" varies to the minds of different people. For instance, most scientists describe Resilience as the work done; that is, work done or work expended in producing a given strain, making no reference to the "comeback" or the work returned, whereas quite universally the popular idea of Resilience is the work or energy returned, which has once been applied to any material, and that the material has stored up, and immediately the pressure or load is released the material gives back a certain amount of this work or energy, and this is generally known as the Resilience of the material. We have gone into this proposition at considerable length, and the farther we go the more confusion we find. We have found that the publishers of Webster's Dictionary are much confused in their definition. As a matter of fact they contradict themselves, and as a result in all probability in the next edition of Webster's their definition will be changed. The term "Resilience" as popularly used is known by the ordinary scientists as Elasticity. However, the prop-

erty we measure by this instrument, which heretofore for want of a better name we have called Resilience, is not Elasticity, for Elasticity as described or understood by scientists is a material's ability to recover after compression or distortion, with no reference to the time factor; that is, the time it will take it to recover. What we are interested in is a material's ability to instantly recover, and this is where the Hysteresis factor comes in, for Hysteresis is mechanical lag; therefore, eliminating the mechanical lag as we do in our determinations, we get the material's ability to instantly rebound or instantly give back the energy that has been applied to it, which is its "life."

To determine the Resilience we note the Normal Thickness of the material and then apply the load, as I said, in increments, noting the reading after the application of each increment. Then immediately we remove the load in successive decrements, noting each reading. A careful observance of the graph obtained by noting these readings shows the action of the material under test. It gives you a graphic picture of just what the material will do—how much pressure it will stand before its compressibility is exhausted, and how much it will "come back." The "come back" property in material is of extreme importance and directly reflects its ability to endure and wear; in other words, its "life." This fundamental abides in Felt, also Rubber. For instance, in Felt if the raw material used is short shoddy, the "come back" property is greatly reduced; whereas, if a very fine high grade long fiber, virgin wool is used, the "life" is much greater, or if cotton is used the Resilience goes down, for the Resilience of cotton is not as high as of good wool. This same situation exists with reference to Rubber; where reprocessed rubber is used in the compound, the Resilience goes down, whereas if a real high grade virgin Para Rubber is used the Resilience is high. We find that the highest grade of Para Rubber, which is cured under proper conditions, runs in the neighborhood of 95% in Resilience, whereas a low grade Synthetic Rubber, which is made largely from reprocessed stocks, runs down as low as 40%. The highest grade of Felt, which is used for piano hammers (the Felt that is used in piano hammers being considered the acme of the Felt makers' art) runs in the neighborhood of 60% Resilient.

Therefore, you gentlemen now have a means of checking up on all of your Felt and Rubber, and will be able to definitely work out an intelligible specification—and once you find the one that works best for your particular need, you can order according to these definite specifications, and check up on the goods you receive and know whether or not you are receiving what you ordered. Obviously, on some of your rubber rolls it will be necessary to build a sepcial testing instrument to test these rolls, for the instrument I am showing you here is only a laboratory instrument for testing small or laboratory samples.

From now on you will be able to buy more intelligently, for you can test the samples anyone may offer and know which one is the best, thereby enabling you to get the most for your dollar.

We also have worked out in conjunction with this instrument certain invaluable tests for you on your Paper—for instance, we have perfected a Tearing Test which we believe is the most reliable up to the present time. Our test is made from the edge and we can test either machinewise or crosswise, either for Tearing Strength, Tensile Strength, or Folding Strength. We also can test the Uniform Thickness, as well as Stiffness and Hardness, also the Resilience of the Paper, all of these being very important properties.

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## The Cost of Labor Turnover

(*Continued from page 513*)

intensive training of workers. Such training is possible only when the force is relatively stable. If the probability is great that new men hired will leave shortly, the employer cannot incur a great expense in training them because he is unable to recover his investment in the workers before they leave. If, however, the prospect of new men remaining for some time is good, the employer may profitably incur considerable expense in developing their skill.

As the prospects of newly hired men's becoming permanent employes grow better, we may expect large sums to be spent by employers upon elaborate training systems and upon the intensive development of workers which will render them far more productive than at present.

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*(Taken from Mr. Sumner Slichter's recent book entitled, "The Turnover of Factory Labor," published by D. Appleton & Company, New York.)*

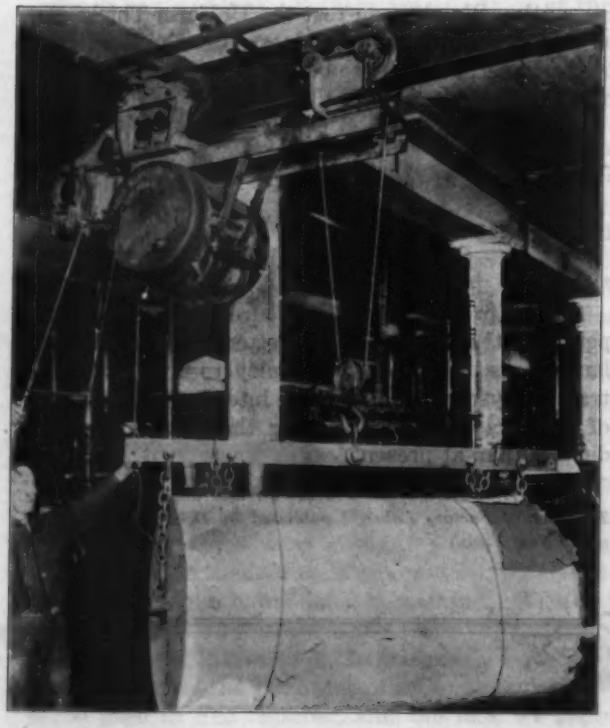
# Practical Ways to Cut Costs and Set the Pace for Greater Production

## Tried-Out Plans and Methods Which Have Proved Successful in Both Large and Small Enterprises—Perhaps You May Find the Solution of *Your* Problem Here

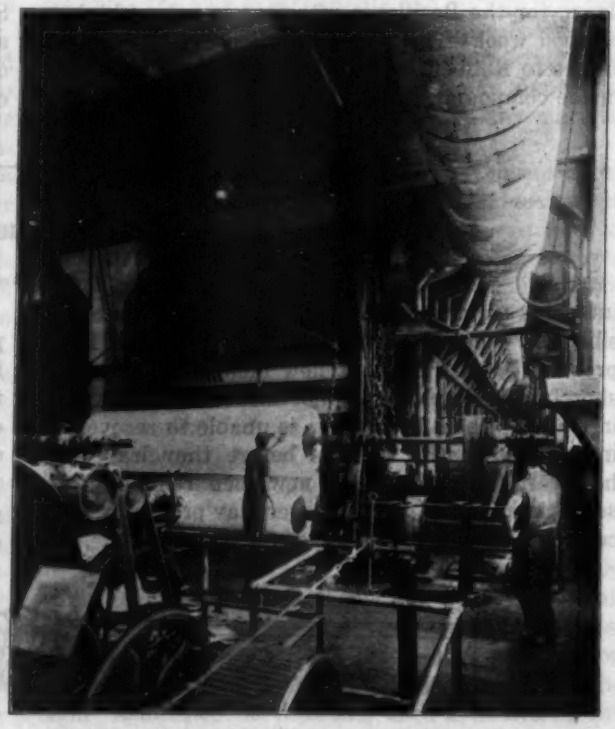
**If you are using man power for transporting your material, you are paying the prevailing high wage for this class of work, and boosting your production costs**

**There are many more economical, quicker and easier ways to transport your product. Your problems are no more difficult than some others that have been solved**

*Overhead carrying system installed in the finishing room of the A. P. W. Paper Co.'s mill at Albany, N. Y.*

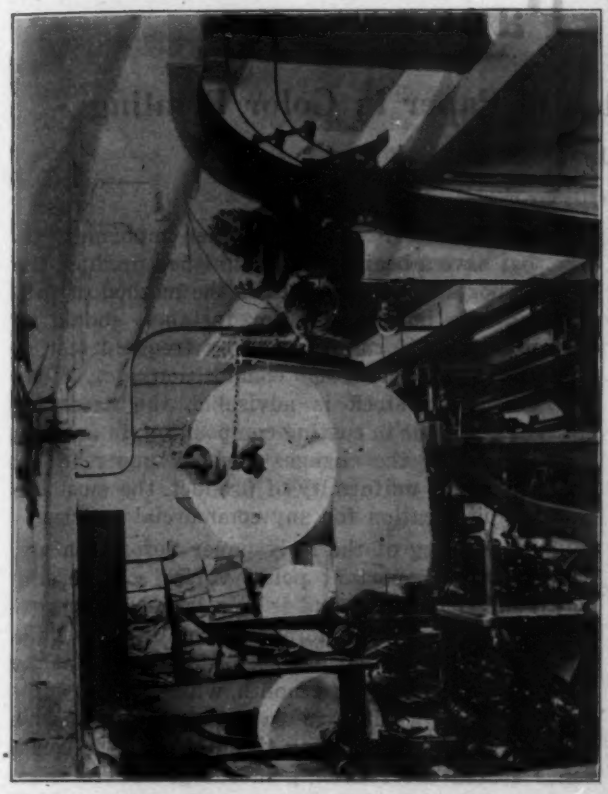


*One-ton hoist with low headroom motor-driven trolley carriage, installed in plant of The Charles Francis Press, New York City*



*Overhead electric hoist installed on paper machine winder in one of our most progressive paper mills*

# Utilize All of Your Floor Space



*One-half ton, one motor, floor controlled installation in a New York newspaper pressroom*

*One-ton transfer crane installed in pulp storehouse by the Nixon Paper Mill of the Dill & Collins Co.*

*Overhead tracks run onto the elevator, where load stands on elevator track and is carried to other floors, where tracks on said floor automatically connect with elevator track, and allow the load to be conveyed off without additional handling*

*Overhead system, showing roll of paper on conveyor being weighed by overhead scales*

*Another finishing room installation that permits more efficient use of floor space*

# Difficulties Encountered in Printing Papers

## Part III—The Shrink and Stretch of Paper in Color Printing

By PETER J. MASSEY

(*Continued from September number*)

THE subject of defective register has probably been given more consideration by the manufacturers of coated papers than by any other branch of the industry. Such a result is what would be most expected, and is directly attributed to the fact that the bulk of coated papers are used in color printing and lithography. That this problem should have received less attention from other paper manufacturers is due, not to any absence of a progressive spirit, or to any mechanical obstacles that are not present in coated paper manufacture. It has been solely due to the fact that the other branches of the industry have been feverishly engaged in solving certain problems that would tend to make their paper the ideal one for the purposes for which the bulk of their production was used, and have not received enough encouragement from the small minority, who are using it for color printing, to further develop their paper with this purpose in view.

Yet around one fundamental fact all paper manufacturers and consumers could meet on common ground. No matter what particular product they may be specializing in, the effect of moisture on paper, and measures whereby this may be reduced or controlled to a negligible factor, should be of interest to them all. The coating mills whose product is always in demand and sells at a premium above the market price are those who have given this subject due consideration and have adopted progressive equipment and procedures in the manufacture of their product.

Many of these successful mills have installed air conditioning and control apparatus on so large a scale that they have the distinction of having been the first to apply this principle in an industrial way to large commercial enterprises. The experiment, and such it was, was viewed by many other industries with the interest that any laboratory process would receive when it is applied to any industry on a commercial scale. During the early trials, and they were many, though not at all serious, few believed that it would be a financial success, but there are many industries now where the very existence of the processes used depends upon constant temperature and humidity systems.

It is a mistake to believe that upon the installation of one of these systems in a mill it will correct all the deficiencies. There are other important factors that have a bearing on the finished product, the most important one of which is the method of procedure. The body paper, for instance, should be kept up to a uniform standard by frequent testing as to its sizing, percentage composition, etc. When any change in stock is advisable, the necessary changes are made in coating composition, in order to compensate for the changes in body paper. This tends to insure uniformity of product, the most important qualification for any commercial article.

The seasoning of the body paper before coating, while a very important point, varies considerably in a number of mills, and is to a large extent governed by the available storage space. In some mills no paper is coated that has not been seasoned at the mills for three weeks or a month, while in other mills manufacturing their own paper, the stock that is run on the machine during the night tour is sometimes coated the following morning. There is no doubt as to which of these papers the consumer will prefer. While all coating superintendents agree that a better sheet can be produced from seasoned stock than from "new" paper, they do not agree as to the length of time required for properly seasoning it, nor have they in many cases proved to the management the advisability of increasing the storage space to allow of properly seasoning the body paper.

In regard to the actual coating operations, there is little or no difference in methods used by the various mills, being conducted under one or all of the following three systems:

By coating the paper on one side, drying and rewinding it before it receives the coating on the reverse side; by coating the paper on one side, drying, and then coating on the reverse side before rewinding; and by coating both sides simultaneously, drying and rewinding all in one continuous operation.

The single coated paper is dried in festoons by the circulation of warm air containing the proper degree of moisture. The double coated sheet, where the coating is applied to both sides at the same time, is dried by "floating," i. e., being supported on an air cushion from the time it leaves the coating machine until it reaches the suction apron, when it is then dry enough to be handled by the regular festoon method

as used with the single coated stock. The temperature and moisture content of the air used in the drying and the volume necessary to dry the various weights of stock are always under the control of the operators.

After the paper is rewound it goes to the finishing room where it is supercalendered, cut up into sheets, examined, counted, packed and shipped.

The finishing room at the mills manufacturing paper for color printing, with very few exceptions, is independent of the machine or coating rooms. There is little or no moisture produced in the finishing room; therefore, no danger from condensation drips from the high humidity that generally prevails in the machine or coating rooms. In addition to protecting the paper from the excessive moisture of the machine room by having a separate room for finishing and packing, a number of mills manufacturing high grade paper and paper board have installed air conditioning and control systems in their finishing rooms, the temperature being kept at the ideal figure of 70°F. and 65 per cent relative humidity.

In the coating mills where no air control apparatus has been installed, the heat required to dry the paper is very excessive and often runs as high as 150°F., owing to the high relative humidity, which in many cases is over 85 per cent. This condition causes condensation drips, which seriously mar the look of the sheet and cause a large waste in the finishing room. The excessive heat used to dry the paper under these conditions causes numerous breaks at the calenders. This increases the percentage of broke and the cost of production, and decreases the tonnage passed over the super-calenders. Without taking into consideration the better quality of paper that is produced where air control systems are installed, they ought to be adopted by every coating mill on account of their efficiency and economy. The saving in fuel, waste of the finished paper in the finishing room, and the broke, and the lost time on the calenders, are more than sufficient reasons for the installation of an air control system. But the fact that coated papers from the mills that have installed air control and conditioning apparatus are very popular with the better class of printers and lithographers and sell at a premium over papers from mills that are not so equipped, is the best proof of its efficiency.

Another important difference in procedure in various mills is in the packing and shipping of the finished paper. The elapsed time between the finishing and the loading for shipment is only a matter of hours in some mills. While this would not be of much importance if the mills in question had constant temperature and humidity control throughout their establishment, it is mills that have no air conditioning system at all that follow this practice, supposedly because orders for their product are such difficult things to get that they accept any order that comes their way, irrespective of the fact that the time allowed is insufficient to produce a good paper. A mill having no control over atmospheric conditions, no matter how urgent the rush order, should not pack and ship its paper without giving it the opportunity to adjust itself to normal atmospheric conditions, and it should not be shipped when the relative humidity in vicinity of the mill is abnormal, for dissatisfaction and trouble will surely result if the stock is intended for color printing or lithography.

In regard to the packing, particular attention should be given to lining the cases with waterproof lining in order to protect the contents from excessive moisture or leaky cars in transit. This will insure you that your product will arrive at its destination with approximately the same moisture content and free from water damage. Considerable loss may result from damage by water if the cases are not properly lined.

The installation of a system along these lines will be of great assistance in lessening the troubles from imperfect register. Paper that has been hurriedly finished, improperly packed and shipped to fill some rush order, when the relative humidity was abnormal at the mill, has always given more or less trouble at its destination. It is difficult for this paper to adjust itself to the atmospheric conditions in the pressroom. If the humidity was abnormally high at the mill, the excess moisture content of the sheet will be the cause of a large shrinkage extending over a comparatively long period and affect every color impression that goes on the job.

Storage means the safekeeping of goods under conditions that will not depreciate their value. Improperly stored paper will depreciate in value to a very large extent. It is therefore very important that the conditions under which it is stored be given the same consideration as other perishable commodities.

In the storing of paper, whether it be at the mill, or at its destination, the conditions must be such that its hygroscopic propensities have received the consideration to which they are entitled in view of their importance. Too frequently this very important matter is overlooked or entirely neglected and the paper is stored in a damp place, with consequent exaggeration of the difficulties in obtaining register when the paper goes to press, as the contraction will be considerable.

In case the paper is stored in close proximity to steam pipes or other source of excessive heat, the opposite will be true. The paper then will have too much expansion between printings, while it is trying to adjust itself to more normal conditions. The "bone dry" or at least less than air dry condition of the sheet will cause it to absorb atmospheric moisture while it is exposed to the cooler and more humid atmosphere of the pressroom.

*(Continued in November number)*

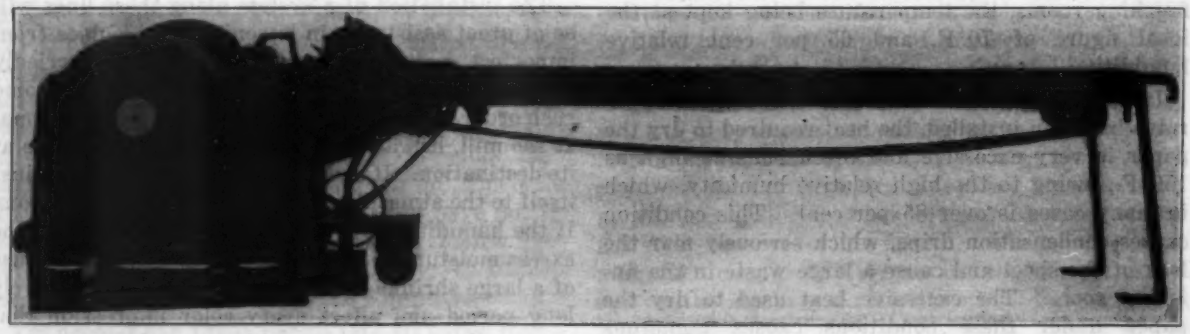
# The Value of Waste Paper Stock in the Manufacture of New Book Papers

By EDWARD T. A. COUGHLIN, B.S., CH., E.

## Part II—Mill Sorting of Old Papers

*(Continued from September Number)*

In our perfected system we have installed a No. 11 "Giant" Triplex Stock cutter, into which can be fed whole magazines. This is the latest type of stock cutter and is the result of many years of experimenting. It is considered by men who have had experience with other cutters to be the leader of all these machines on the market. It has been improved many times to take care of the weaknessess that showed up on working it to capacity. The weight of the machine is 8300 pounds and is so constructed that the shock and jar resulting from the cutting of thick books is hardly noticeable and gives practically no vibration. Its rated capacity for cutting paper is three tons as a minimum per hour, but it can cut and handle five to six tons, depending on the range of power that can be furnished to it and the length of the cut desired for the papers. We are now running it with a two-inch cut, but are not cutting more than at the rate of two tons per hour, because of insufficient duster and cooking capacity.



### Cutting and Shredding

For the time being, the cutter will be run in conjunction with the railroad and fan dusters. Since the function of the railroad duster is largely that of cutting or shredding the papers, this new cutter will do this work much better, giving a more uniform cut and handling many times more papers than the duster, hence the railroad duster may be eliminated. By increasing the screening surface of the fan duster, to such an extent that it will be able to handle the papers from the cutter when the latter machine is run to its full capacity, the time for furnishing the papers to the cooking tanks will be reduced to a minimum, thereby enabling the maximum output from the sorting rooms to be handled and cooked with the least possible expense.

### The Dusting of Old Papers After Being Sorted

Strange to say, the dusting of the old papers receives only the minimum amount of attention—if any at all. It is considered a mechanical process of dumping the papers thru the apparatus and that is the end of it. In reality, the dusting and screening of loose dirt from old waste papers by the fan duster in the dusting room bears the same relative importance to the resultant finished paper, as the screening of bits of bark and rotten wood from the pulp wood chips on the rotary screen bears to the production of fine clean pulp.

To produce paper free from dirt, one must help oneself along by removing the greatest amount of dirt and dust at the initial step of the process. If the duster delivers thoroughly dusted papers the subsequent steps will be greatly simplified.

### Prevention of Clogging

The variation in feeding of the old papers to the dusters is another important point. The apparatus is built for a certain capacity, say 2500-4000 lbs. per hour. Below this amount and up to this figure the papers are delivered from the duster in good condition—that is—thoroughly disintegrated and dusted. In the variation of the feeding, as high as 4000-6000 lbs. per hour are forced—literally forced—thru the machine till it becames clogged and stands a chance of becoming dangerously overheated from the friction. The dust cannot be properly handled with the exhaust fan, and it fills the air making it almost impossible to live in such an atmosphere. Naturally the

papers also will come out still dusty and dirty from this overburdening process. It is the wrong procedure. Any engineer will caution you about overburdening a machine. To correct this wrong, the dusting capacity should be increased, the screening area of the slow rear rotary screen should be enlarged in the same ratio as the rated capacity of the machine for thoroughly dusted papers.

## To Reduce the Cost of Sorting

To reduce the first cost in the reclaiming of old papers is possible with a few precautions. The first essential is the purchasing of the waste paper stock. Since the quality of the product of the mill is governed by its constituent materials, or in other words that which enters into the composition of the paper made, it requires very careful and judicious selection of the raw waste paper stocks. Orders should be placed with only reliable packers, such as have been known to live up to their guarantee of doing an honest, fair and square business. It would not be a bad or foolish suggestion to visit these packers at their own sorting and packing rooms and observe the care that they give in handling the papers as received, their equipment, and the amount of business that they conduct. Specifications should be given that a strictly uniform, clean grade of papers is desired and these orders should be followed out to the letter. The Salvation Army Association has gone into the waste paper business quite extensively and their packings enjoy the reputation for being absolutely graded, and free from ground wood. They command a higher price for their wastes, but it would be cheaper in the end if we could use their stock or that of similar conscientious companies.

## Choice of Stock

Only solid magazines, overissues, unstitched, school books and solid ledgers together with lithograph and shavings should be used to reduce the cost of sorting. These grades require only the separating of the heavy colors and a sorter can handle easily 3500-5000 pounds a day. The shavings can be added directly to the beater provided that they are unprinted and the beating capacity for completely brushing out the fibers is sufficient. Instead of being trucked in the sorting room, after sorting, the papers can be sorted directly onto and delivered to the dusters by conveyors.

Instead of tearing the magazines and books by hand by the sorters, this work can be much more quickly and better accomplished by machinery—by a cutter or shredding device.

## Makes for Better Quality

From the use of the above mentioned grades of papers one would be benefited by the increase in the quality of their product. The product would be more uniform as to color and cleanliness. Being of constant composition, the cooking and subsequent washing and bleaching of the papers would not be such variable items. Paper free from ground wood specks and undissolved ink would result, and one could demand an increase in price from 50 to 75c per hundred pounds. Further, one could duplicate sheets and other classes of paper which, at present, are out of their field because of their freedom from dirt particles.

By the use of the cutter for tearing and shredding these good grades of papers, the labor now employed for this work could be decreased forty to fifty per cent and the output of the sorting room would not be decreased.

## Carrier System of Sorting

By this system of sorting is meant the process of handling old waste paper from the bale directly to the carrier or conveyor.

The bales of paper stock are arranged on both sides of the carrier, usually three or four on each side. The carrier may be of any suitable length, but one about fifty-five feet in total length and two and one-half feet wide has been found to be of convenient and efficient dimensions. The six or eight sorters are stationed at the farthest end or starting point of the carrier. At the mid-point is placed a sprayer, which furnishes a continuous fine spray of a testing solution of aniline sulphate directly upon the surface of the papers as they pass by on the conveyor. The strength of this aniline testing solution is one pound of commercial sulphate dissolved in fifty gallons of water, and has been giving excellent results in indicating the presence of ground wood in the paper stock.

## Increased Production

The speed of the conveyor is 55 feet per minute and in the space of twenty feet or 22 seconds this solution will show the yellow color of ground wood, if any is present among the sorted papers. The use of this spraying test is very necessary considering the prevalent use of bleached ground wood in book papers. This book paper returns to the mill using old papers and it is impossible to identify the presence of ground wood by the eye, and in order to eliminate such papers it has become necessary to test every sheet on the carrier.

At the delivery end of each carrier are stationed two women inspectors. It is the duty of these two women to throw out any sheet that shows the yellow color reaction of the sulphate upon the ground wood.

It is at once obvious that the six sorters grouped around the receiving end of the carrier cannot waste too much time sorting closely. They must keep the surface of the carrier completely covered at all times. To do this they must be able to sort by sight and have a good knowledge of the general run of paper stock. Anything that is ground wood, or appears to be ground wood, or of the nature of which there is any doubt in their minds, is thrown out as a discard.

These discards from the two carriers are then

(Continued on Page 525)

# The Pulping of Hemlock Wood

By D. F. O'CONNELL
Chairman, Sulphite Pulp Committee

This paper was presented at the meeting of the Northwestern Division of the American Pulp and Paper Mill Superintendents' Association on Oct. 4 at Wausau, Wis.

I FRANKLY confess my inability to ably expound the subject we are going to discuss here this morning, and I feel I am taking a liberty in taking up any time from this body of men assembled here, whose physical and mental abilities has made it possible for them to attain the highest positions in the manufacture of pulp and paper.

Past experiences have taught me that sometimes the sulphite superintendents are misjudged by the paper mill superintendents, and on the other hand the paper mill superintendent is often misjudged by the sulphite superintendent. An occasion of this kind, bringing us all together for an open discussion of the many different problems of paper manufacture, must bring a better feeling between us. Not only the superintendents working at one plant, but every superintendent assembled here must have a kinder feeling for his associates than formerly following a discussion of this character.

The subject before us today, the pulping of hemlock wood, is surely of vital interest to us all—vital, because if we sulphite members furnish the paper mill men with a good, clean, desirable grade of sulphite we will have eliminated for them two-thirds of their troubles and they will meet us with a happy, contented smile, which in turn not only reflects on us but on all the working men of the plant as well. For when both superintendents are satisfied, that satisfaction is handed down clear through the entire plant and perfect harmony will prevail. On the other hand a raw, unsatisfactory grade of pulp will have the opposite effect on the entire organization, and trouble occasioned by this friction will lower the efficiency in every department.

## A Practical Treatise

Now, getting the opinion of all sulphite superintendents of the country cannot help but bring the very best results. Exchange of ideas and the exchange of practical knowledge will surely be of benefit to us all. Now, gentlemen, we have here today on this committee D. B. Davies, A. T. McFarlane and Paul Sievert, and as this subject of pulping hemlock wood is open for general discussion, anyone wishing to ask a question at any point in my address may do so by rising, and he will immediately have the undivided attention and the services of the entire sulphite committee. However, I beg you to understand that this American Pulp and Paper Mills Superintendents' Association was formed on practical lines, and this discussion was prepared on practical lines only, so we ask you to put your question along practical lines because deep technicalities will not enter into this discussion.

## Sulphur vs. Wood

The condition of the wood as it goes to the digester is a deep and vital problem to the sulphite man. I think you will all agree with me that the conservation of our hemlock forests should meet with our greatest endeavors in getting the largest amount of pulp from the wood used. I have given this subject a great deal of time and thought and have with me today the opinion of some very competent men in the handling and using of hemlock wood. As we all know, in the past whenever our respective managers or superintendents would meet the first question that arose was, "How much sulphur are you using per ton of pulp?" It has never yet been my experience to have a manager or superintendent ask me, "How much pulp are you producing per cord of wood?" Now the reason for this is very evident, because of the many sulphur saving devices that are on the market, and large amount of advertising done both through literature and personal solicitation by agents of the devices when calling at our plants. They have succeeded in placing the question of sulphur economy uppermost in our minds. I am sure that if the same amount of literature and same number and type of agents were sent out to exploit wood saving devices it would place wood in first position in our minds and reduce sulphur to a secondary position where, in my personal opinion, it belongs.

## Relative Increased Cost

The reason I am using Wood and Sulphur as a basis to start this subject is that one depends upon the other for production. And very often the Wood is sacrificed so that we can show a low sulphur consumption. In this way we keep astride of the times, but to the detriment of the future generation, as wood is rapidly disappearing and some time will, in the not long distant future, have disappeared. The first contract for sulphur I ever witnessed, about 1900, called for $26.10 for a long ton. Today we are paying approximately the same as we did twenty years ago.

While on the other hand in 1900 we had wood laid down at our plant for $4 a thousand feet, and at that time accepted nothing but the very best of sound hemlock, as late as ten years ago we had wood laid down for as low as $8 per M. Today it ranges between $22 and $25 per M. While sulphur has not increased

one single cent in twenty years, wood has increased in price 600% in this same period, and at these prices we cannot lose track of one single item of expense. Therefore, let us make Wood the paramount issue and build our entire structure around wood saving lines. In my opinion the superintendent or manager that will first turn to the report on wood used, and pulp made per M of wood used, has got his thinking cap on and is looking into the future.

Perhaps not many of you know that the sulphur deposits in the United States are unlimited, while at the present rate of consumption and the present growth of wood there will not be one available hemlock log in the states of Michigan or Wisconsin in twenty-seven years.

## Wood Conservation

Perhaps the following figures taken from Government reports will be of interest to you: Total stand of hemlock wood in Wisconsin, 11,600,000,000 board feet; total stand of hemlock wood in Michigan, 15,000,000,000 board feet. Taking into consideration the Government estimates, also the growth of hemlock wood, which is very slow, we would have an additional 3,000,000,000 board feet, making a total of 30,000,000,000 board feet of available standing hemlock timber in both states.

Consumption yearly is 614,622,000 board feet in the state of Michigan and 709,347,000 board feet in the state of Wisconsin, making the yearly consumption of both states 1,323,969,000 board feet. So you can see, gentlemen, why wood should be uppermost in our minds and why the future must bring some very radical changes in its use that will lead to conservation.

## The Desirability of Seasoned Wood

Now, going into the wood proposition the question arises, "When is wood in the best condition for pulping?" Serious consideration of this question will assist in conservation. Opinions differ widely as to what is the best state of wood for pulping. I have the opinions of two large manufacturers here to whom I have written on this question, and they have given me permission to quote their names and opinions. Mr. Fred Boyce, of the Wausau Paper Mills Co.:

"I consider dry wood the best by far, and green wood the worst, in making sulphite pulp. We cook here in the summer time wood taken from the river and in the winter time wood from the yard, with a little green wood occasionally in the winter. We find that dry wood is the most economical and has the least screenings. Green wood has the smallest yield and the most screenings. In addition to this wet wood has to be cooked down to a lower test and is liable to yield a soft pulp if you are not extremely careful, especially during the latter part of the summer and fall. Green and seasoned wood ought never to be mixed."

Mr. Paulson, of the Kimberly-Clark Co., the largest users of hemlock wood in the states of Wisconsin or Michigan:

"One would naturally suppose that dried wood is easier to cook and yields whiter pulp with less screenings. This was true years ago, when the strength of the cooking acid hardly ever exceeded 4% of total $SO_2$, and when the method of steaming the digesters was such that it was impossible to obtain perfect circulation of the heat, but with our present method of steaming, whereby a thorough circulation can be obtained at all times, and with a cooking acid containing in the neighborhood of 6% total $SO_2$ I find that the advantage of drying the chips is so small that it can hardly be noticed, and when taking into consideration the fact that when the chips are dried there is a possibility of getting charred wood with the consequent black dirt in the pulp. I am fully convinced that this method will be abandoned everywhere."

## Wood Yielding Best Quality Chips

My personal opinion is that the proper stage for the highest yield from wood is immediately after peeling, say about August, September or October, as the wood is then partly dry and is in its greatest strength. In my many years of experience in manufacturing sulphite, I have come in contact with many different conditions of wood, and always found dried wood more economical. Mr. Paulson's letter on dried wood refers to an artificially dried chip that has been thoroughly dried and hardened in drying process, which in my opinion would make it very hard to pulp, and make Mr. Paulson very right in his contention, but I must fully agree with Mr. Boyce that the naturally dried wood produces a better, a whiter and a cleaner grade of hemlock pulp, and can be handled more efficiently through the entire plant. I will also go on record as saying that the sulphite superintendent who has thoroughly good dry, seasoned wood available for pulping has solved 50% of his problems.

## Seasoning and Rossing at the Camps

The proper seasoning and rossing of wood in the logging camps will have to be brought about in the near future on account of the exorbitant freight rates. The different mills will find it more to their advantage to deck their logs at the sidings and ship them down in the spring or summer months as they are needed. This will eliminate storage costs in the yards and will save 25% to 30% of the freight rates, which will more than cover the charge of decking and insurance. A grade of sulphite pulp satisfactory to us all would be a result of this procedure and would be of inestimable value.

## The Wood Room

Our next problem is the Wood Room. In the sawing and barking there must be, of course, some waste. Perhaps new devices will arise in the future to eliminate this somewhat, but I doubt if it can be changed

very much. In the Wood Room the Chipper is the vital point and needs special attention. I think I can do no better on this subject than to quote you from Mr. Boyce's letter: "In regard to yield of wood, the first thing is to see that you have a proper chip. Probably one-half the mills do not take proper care of their Chipper. The bed-knife is not changed often enough. A bed-knife should not be run over thirty-six hours, and the Chipper should be properly adjusted at all times."

## Chipper, Care and Adjustment

Mr. Boyce coincides with my ideas exactly. We are now changing our bed-knife at our plant twice weekly, and as we work 8 hours per day, this would mean 24 hours' actual working time for a bed-knife. I have also found it essential to set this Chipper after each change of knives, which is mostly 4 times a day, or after a run of 2 hours, which in my opinion should and does produce a very desirable grade of chips. The Crusher, the Screen and Re-chipper are all generally a matter of opinion as to their proper location and their different arrangements, but they generally bring about the same results in every plant.

We now have our largest item of chips in the chip bin, and need only the presence of steam and acid for cooking purposes for pulping the hemlock wood.

## Acid Making Procedures

The acid plant is truly termed the heartbeat of the sulphite mill, in which temperature is the largest factor. In fact everything we do in the acid plant is controlled by temperature. Still, here again we have various methods and various ways, and we are of various minds regarding the proper method of producing a good cooking acid.

I will explain the methods used at the Northern Paper Mills in a rough way. We produce Sulphur Dioxide at a given test of 17%, cooling it down to a temperature of approximately 78° F., using the Jenssen acid system. I have found that a water temperature of less than 70° would give the best results in taking up this dioxide gas. We are using in our Jenssen system a pure calcium stone, with less than 3% of magnesia. By using these temperatures I found that we make a very good, desirable raw acid, with a total of 3.8 to 4% $SO_2$, with a free of approximately 2.8 to 3%, which we easily reclaim up to 5%, which from my experience can be considered as a very good cooking acid.

## Guarding Against Sulphur Trioxide

One thing must be carefully attended to—that is, the elimination of $SO_3$ from your acid plant, and as this is generally formed in the sulphur burner the methods of burning sulphur must be watched very carefully and a good even fire be attained at all times. Determination for strength of sulphur gases should be made repeatedly during the operation of the acid plant. A test of less than one point Baume should be maintained in the weak tower at all times for economy when using the Jenssen acid system, which system is most generally used in the Northwest section and perhaps throughout the country.

I will gladly answer to the best of my ability any question that I can regarding acid making to any member of this organization.

## Methods of Cooking

The Cooking Room is another vital spot to the sulphite pulp manufacturer. I think very often too little attention is paid to the temperature of the acid as it goes to the digester. I have always tried to maintain a temperature of at least 100° F., as putting acid into your digester below that point means additional steam, which in turn means a weaker acid before the penetrating point is reached. I have always tried to bring the digester to pressure very rapidly, say in short cooking from 5 to 6 hours; digesters brought up to pressure in from 45 minutes to one hour will bring the best results. Longer periods of steaming may be used to advantage in the longer grade of cooks, but I have always favored and have always had the best results in a steaming period of, say, 1 hour, as the condensation will be less and the strength of acid will be higher in the shorter steaming than in the longer. Of course this means I must have at least 140 lbs. of pressure at the valve head, which insures a hot and even circulation. With very little condensation entering the digester to weaken the acid, the saturation from the chips will be more thorough and more uniform than the slow gradual steaming process which is today used by some of the mills.

## High Yields and Capacity for Digesters

During the summer of 1918 I cooked continuously with two digesters, the cooks ranging from 4 to 4½ hours, and I remember that in the month of September, 1918, I did not have a digester that was on for a period of 5 hours. Our waste in screenings during this month was less than 3%, and we had a yield of 2,090 lbs. per M of logs used. This cooking time was only made possible by using a very high pressure. I will read you a rough outline of the cooking time. Acid ranging around 5% total, with a 4% free. All cooks were brought to pressure in 45 minutes. When I say pressure I mean 90 to 100 lbs. We held this pressure at this point for 3 hours, and blowed back to 80 lbs. during the last hour, and blowed all these digesters at a given iodine test of 5½ to 6½%. I won't say that this is the best method in the world of cooking, but I will say that 100 lbs. pressure for the first 2 hours of your cook, while your acid is in strength, will not injure your fibers in any way, and is as good as 6 hours of low gradual pressure of the so-called long cooks. I have here a sample of the fastest cook it has ever been my experience to make. Cooked with a 100 lbs. pressure during the

entire cooking period, and a cooking period of 3 hours and 45 minutes, and while this is not the strongest stock possible, I think you will agree with me that it is a fair average of hemlock pulp. To consider the blow pit room, screen room and wet room would make too long a subject to take up at this time, and I feel as though you have been very patient with me so far, and as there are more brilliant and able men to follow me, I will merely add that my time and services are at all times at your disposal, and will endeavor to go further on the subject at our November meeting. I thank you.

## The Value of Waste Paper Stock in the Manufacture of New Book Papers

(*Continued from Page 520*)

sorted and tested closely to eliminate papers having ground wood in their composition by three experienced sorters at the usual sorting benches.

In making a comparison of the carrier system of sorting with the bench system it is, of course, necessary to suppose the wages paid workers at the bench is based on day work at $2.65 per day and not at the piece rate of 15c per hundred pounds.

It has been stated that with the carrier system twenty girls can turn out 50,000 to 55,000 pounds of gross weight of paper stock in eight to nine hours. This compares with an average of 46,000 pounds gross weight of paper stock, in 1916, sorted by the bench system by thirty girls.

Further advantages noted by the use of the conveyor system is the decreased wear and tear of the floors, increased storage space for paper stock by eliminating the sorting benches, elimination of one man trucking barrels and containers which are necessary with the bench system.

(*Continued in November Number*)

# Roadways and Approaches to Mills

At many mills, the roadways and approaches are in an awful condition, the pavements necessary for convenient communication between the several mill units and the wood yard are very conspicuous by their absence and the floors in the mills leave many things to be desired in the way of safety and efficiency.

A large number of accidents are directly attributable to the fact that these important matters have been neglected. Safety First signs, calling the attention of the workers to danger of walking on the railroad tracks, cannot be expected to prevent this practice when there is no alternative provided nor can real efficiency be attained in the mill where free intercourse between the different units and the mill yard is handicapped by poor and neglected pavements.

As a class the mill managers do not as yet realize the benefits to be derived from replacing the dirt and cinder roadways by concrete, asphalt or wood block pavement. However, through the means of the intelligent cost system now being installed in many mills quite a number are now beginning to realize that poor roadways and pavements have considerable influence on the production costs.

In addition, to facilitate the moving of materials and reducing accidents there are many indirect benefits that will accrue from good roadways and floors that do not at first seem apparent.

The elmination of dust will assist in making cleaner pulp and paper as good roadways are in themselves practically dustless. If dust does settle on them it is easily removed by flushing.

The removal of snow in the winter is an especially trying job on dirt or cinder roads and makes the vicinity of a paper mill an impassable quagmire when the spring thaws come, while a hard surfaced roadway can be easily cleaned by an ordinary road scraper, and make the mill just as accessible in winter as in summer.

The original cost is more than warranted by the saving in time in intercommunication between the mill units, the decreased cost in handling and conveying of materials and in accident prevention, while the upkeep and maintenance cost of mill roadways has been shown by experience to be very low, twenty-five dollars a year per mile being a fair average in every instance.

Along with better roadways goes more adequate fire protection, more neatness and cleanliness in the mill and greater efficiency throughout the whole plant, as the clean neat surroundings of the mill are bound to have a psychological effect on the superintendents that will cause them unconsciously to have the work in the mill performed with greater harmony to the surroundings, which means with cleanliness and efficiency.

# Some Observations on the Deterioration of Wood and Wood Pulp

By OTTO KRESS[1], C. J. HUMPHREY[2] and C. AUDREY RICHARDS[3]

*Forest Service, Forest Products Laboratory, Madison Wisconsin. (In Co-Operation with the Bureau of Plant Industry and the University of Wisconsin)*

THE Forest Products Laboratory has, in the past, received numerous requests from pulp mills for information relative to the prevention of the decay of pulp wood and wood pulp by the various molds and fungi, and possibly bacteria, which cause this deterioration. In view of the limited appropriation available for this work and the numerous other urgent problems requiring the attention of the section of pathology, it was found impossible to study this problem intensively. Recently, however, some of the pulp mills have again requested the laboratory to study this problem, and in view of the increasing cost of pulp wood and wood pulp an investigation of this problem, of which this paper is a preliminary report, is under way.

The laboratory was furnished, by a cooperating paper mill, with a shipment of approximately 1,000 pounds each of infected and of freshly ground groundwood. The pulp had partially dried during shipment, the clean pulp being 42.8 per cent bone dry, while the infected pulp, as received at the laboratory, averaged 41.8 per cent bone dry.

Our cooperator described this shipment as follows:

"One lot of pulp is freshly ground pulp from approximately 70 per cent spruce and 30 per cent balsam, ground at close to 70 H.P. with a 10-cut, screw thread bur at 160° temperature. The other pulp is of similar wood and similar grinding, except that it was stored for six months in a dark, high basement where it became quickly infected, as the laps show."

The pulps as received were studied both as to their paper making qualities and as to the organisms causing the deterioration and their possible control.

## Physical and Chemical Characteristics of the Clean and Infected Groundwood:

Figures 1 and 2 made under the same magnification, showing the typical appearance of the infected and clean groundwood, clearly indicate the effect of the infection on the wood pulp fibre. The fibre length of the infected pulp averaged 0.25 m.m., while the clean ground pulp gave an average of 1.09 m.m. As can be seen from Fig. 2, the fibres of the infected pulp have been destroyed to a considerable extent, the resulting pulp being brash and brittle, and in some of the infected areas the pulp crumbles to a dust when a sample is rubbed between the fingers.

## Chemical Characteristics

Samples of both the infected and clean groundwood pulps are being studied to determine their more important chemical constants. It is hoped that the information to be obtained from a study of the chemical composition of the two pulps can be correlated with their physical and paper making characteristics.

To date only the cellulose determination has been made, showing a yield of 50.7 per cent for the infected pulp and 57.8 for the clean groundwood pulp. The results of this investigation and the interpretation of the data obtained will be presented as a paper at a future date.

## Freeness Test

Separate portions of the infected and clean groundwood pulps were shredded in a Williams shredder and then opened up in a small beater under as near identical beater conditions as possible. The

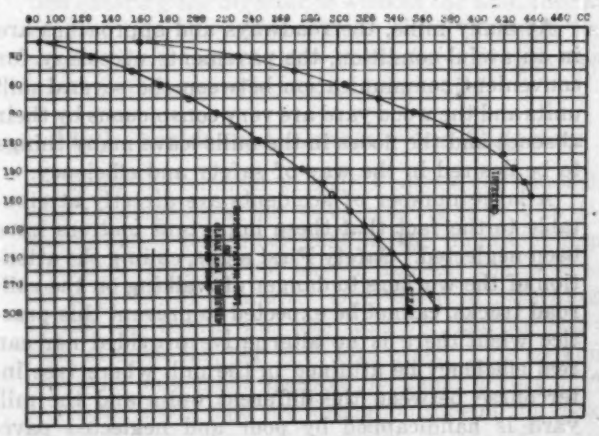


*Fig. 3*

SKARK SEDIMENTATION TEST ON INFECTED AND CLEAN GROUNDWOOD PULPS

| Time, Seconds | Infected Groundwood Discharge C. C. | Clean Groundwood Discharge C. C. |
|---|---|---|
| 15 | 180 | 90 |
| 30 | 230 | 125 |
| 45 | 270 | 155 |
| 60 | 305 | 175 |
| 75 | 330 | 195 |
| 90 | 355 | 215 |
| 105 | 380 | 230 |
| 120 | 400 | 245 |
| 135 | 420 | 260 |
| 150 | 425 | 275 |
| 165 | 435 | 290 |
| 180 | 440 | 295 |

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[2] C. J. Humphrey, Pathologist, Bureau of Plant Industry.
[3] C. Audrey Richards, Assistant in Forest Pathology, Bureau of Plant Industry.

resulting pulp was put through a small hand screen, pressed under a wine press, sampled for moisture and tested for freeness by means of a Skark Sedimentation Tester. The results of the tests are given in Table 1, while Fig. 3 shows the curve which indicates the far greater freeness of the infected pulp over the fresh pulp.

In this connection the difference in feel of the same percentage of suspension of both clean and infected groundwood pulp is of interest, the infected pulp, due to its shorter fibre and high percentage of fibre fragments, giving apparently a suspension of less density than is obtained with the clean pulp.

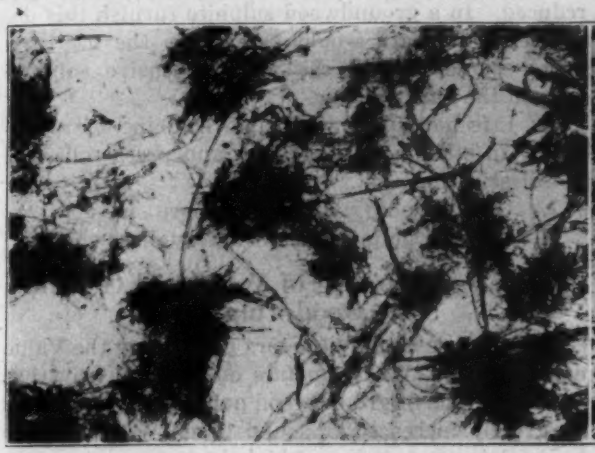

*Fig. I. Clean ground wood pulp*

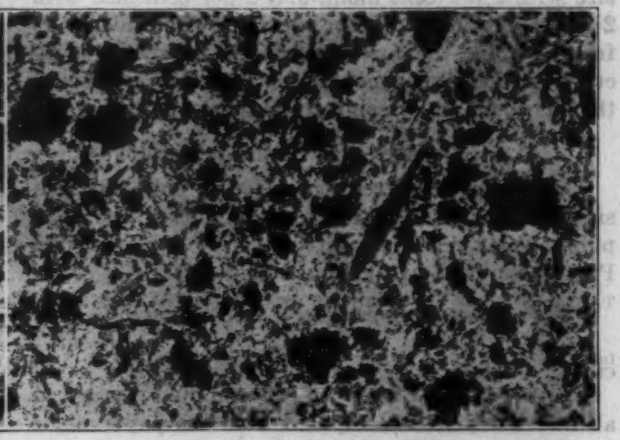

*Fig. II. Infected ground wood pulp*

## Behavior Towards Dyestuffs

Comparative dyeings were made using acid, basic and direct cotton colors on both clean and infected pulp to note any possible differences between the two stocks. The infected pulp was considerably darker and duller, so making the hand sheets, made from the dyed infected pulp, very much duller than the sheets prepared from the clean pulp. The depth of color produced on both stocks with the three classes of dyestuffs used was practically identical.

*Fig. IV. Several laps showing damage done by wood-destroying fungi, and various molds*

## Paper Making Characteristics of the Two Pulps

Under as nearly identical beater and paper machine conditions as possible, runs were made of infected and clean groundwood pulps, the stock being run as 100 per cent clear groundwood pulp into waterleaf paper. Runs 1 and 2 were made under ordinary conditions with recirculation of the white water. As the experimental machine at the Laboratory is only a 15-inch machine, with a very limited output of paper per hour, it was thought advisable to make comparative runs 3 and 4 without circulation of white water. In this way, it was possible to obtain some idea of the relative loss of stock by carefully weighing the pulp into the beater, the finished paper and the small amount of broke produced.

According to this procedure, the conversion loss of the clean pulp was 7.5 per cent while the infected pulp lost 16.0 per cent. Table II shows the comparative strength tests on waterleaf all groundwood paper, made from the infected and clean groundwood pulps.

TABLE II—STRENGTH TEST ON WATERLEAF PAPER MADE FROM INFECTED AND CLEAN GROUNDWOOD*

| | Weight per ream Lbs. | Bursting strength lb. per ream Lbs. | Bursting strength per .001" thickness Lbs. | Breaking average across and in machine direction Meters | Stretch, average across and in machine direction Per Cent | Folds, average across and in machine direction No. |
|---|---|---|---|---|---|---|
| Run I—Infected Groundwood .... | 73 | .16 | 1.2 | 1030 | 2.5 | 0 |
| Run II—Clean Groundwood .... | 72 | .42 | 3.1 | 1920 | 3.8 | 2 |
| Run III—Infected Groundwood .... | 79 | .17 | 1.2 | 1220 | 2.3 | 0 |
| Run IV—Clean Groundwood .... | 59 | .46 | 3.6 | 2200 | 3.3 | 1 |

*All strength tests made at approximately 65 per cent relative humidity.

The paper made from the clean ground wood showed 2½ times the bursting strength and double the tensile strength of the paper made under similar conditions from the infected pulp. Under mill conditions infected groundwood pulp is used sparingly

in the furnish, but results obtained indicate that in such a furnish considerable excess of sulphite or other higher grades of pulp must be used to counteract any decrease in strength of the finished paper.

In running the infected groundwood on the experimental paper machine, it was noted that the stock was considerably freer than clean groundwood and also had a decided tendency to stick to the couch, press rolls, etc. Further, the stock foamed badly, and it was thought that this might be overcome by sizing. Tests made using, respectively, 1 per cent size with 2 per cent alum, and 2 per cent size with 2½ per cent alum did not overcome the tendency to foam. While the foaming offered no special difficulty on the experimental machine, it is believed that it would under commercial mill conditions.

## Appearance of Finished Papers

The paper made from the infected pulp was considerably darker than the paper made from the clean pulp. Color readings were made by the Ives Tint Photometer and are given in Table III.

TABLE III—TINT PHOTOMETER READING OF PAPERS MADE FROM INFECTED AND CLEAN PULPS

| | Parts Blue | Parts Green | Parts Yellow | Parts Black |
|---|---|---|---|---|
| Infected | 50.5 | 58.0 | 66.5 | 125.0 |
| Clean | 60.5 | 67.6 | 77.0 | 94.9 |

The paper made from the infected pulp was not at all ink resistant as compared with the paper made from clean pulp, the infected pulp showing, by the flotation test, approximately 1/10 the ink resistance of the paper made from clean pulp. No difficulty was experienced in sizing the infected pulp so that the resulting paper would be ink resistant.

The paper made from the infected pulp was extremely dirty, containing approximately twenty times as many specks per unit area as was found in the clean groundwood. The majority of the specks are in our opinion due to the conversion of the original fibre into a fibreless mass by the action of the wood destroyers. These fibreless masses break down under the roll and form the small specks which are found in the finished paper.

It was thought that through the decay of the pulp the ash content of the pulp might be raised above that ordinarily found in clean groundwood. This was not found to be the case, the ash of the infected pulp being .40 per cent against .44 per cent for the clean pulp.

## Conclusions Regarding the Comparative Paper Making Qualities of Clean and Infected Groundwood Pulp

Infected groundwood pulp, of a condition similar to the shipment received at the Laboratory, had the following drawbacks in comparison with clean pulp made from similar wood and under simliar conditions:

1. Decided decrease in fibre length, so affecting the yield, felting quality of the stock, strength of the finished paper, and slowness of the stock.

2. Infected pulp is too free. While groundwood pulp is often considered too slow, the extreme freeness of the infected pulp would offer difficulty in carrying the necessary water on the paper machine and in securing a good formation in the finished paper.

3. Infected pulp is very much darker, thereby dulling either white or colored sheets in which it is used.

4. The yield of finished paper based on the percentage of groundwood used is decreased approximately 10 per cent.

5. The strength of the finished paper is decidedly reduced. In a groundwood sulphite furnish this decrease in strength would necessitate the use of a larger percentage of the more expensive sulphite pulp in the furnish.

6. Infected pulp on the paper machine offers difficulty in sticking to the couch and press rolls and in excessive foaming.

7. Infected pulp will require more sizing.

8. Infected pulp will make a very dirty sheet.

## Decay and Molding of Wood and Groundwood Pulp

In an article on the "Factors Influencing the Value of Pulpwood," Wells,* points out very clearly that the production of groundwood pulp at any mill would be greatly increased if sound green wood were to be used instead of logs which have been stored in the yards for from one to three years. Under present conditions of storage there is considerable loss in using old wood, due to the action of wood-destroying fungi and the work of burrowing insects in the stock. Nor does this loss stop when the wood is converted into pulp, as any fungus infection present will continue to develop when the pulp is placed in storage, and it is probable that here the greater losses occur mainly through the ravages of molds and wood-destroying fungi.

The deterioration of pulp is due principally to two classes of fungi, namely, the wood-destroying fungi and the molds. In either class there may be a considerable number of different kinds, separable botanically, but we are not here concerned with the slightly varying action of individual species but with the groups collectively. The two principal classes, however, should be kept clearly in mind when discussing their action on pulp.

The wood-destroying forms are undoubtedly the more important in reducing the yields and physical properties of the pulp and paper into which such stock is converted. These organisms represent the "higher fungi," so-called because of their more complex life cycle. In the complete life cycle we distinguish between the vegetative, or growing, stage and the fruiting stage. The first stage consists of fine interwoven cotton-like threads, termed mycelium, which is very often white, but varies from yellow to brown, as in the "red-rust." These threads

*Wells, Sidney D., "Factors Influencing the Value of Pulpwood." Paper. 2 January, 1918.

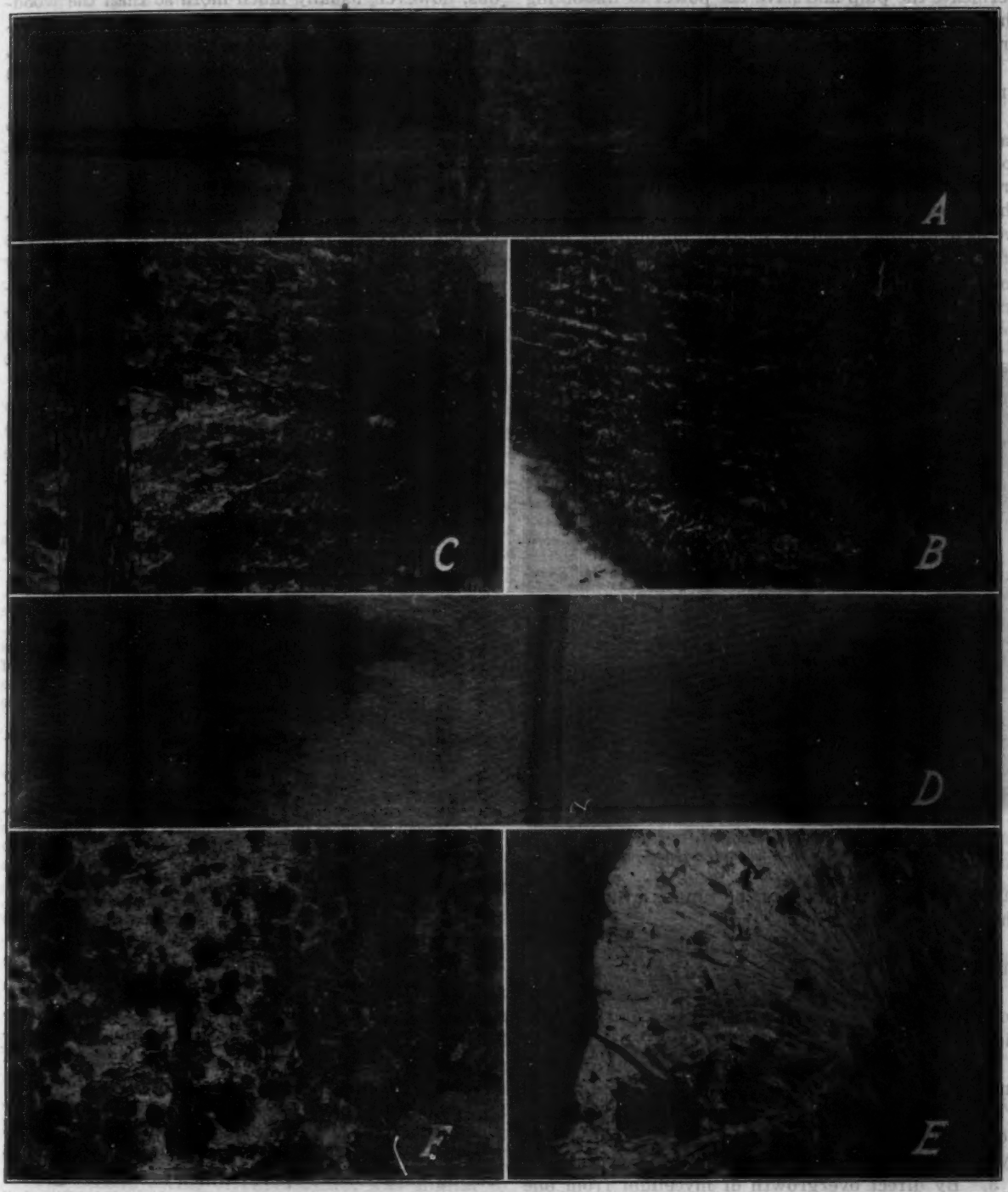


*Fig. A. A lap of pulp showing a grey pattern along the folds, probably by a mold. Many small, dark brown, round spots scattered over the sheet. Fig. B. Part of a large orange-cinnamon to russet area, covered with fine strands of mycelium of a brown wood-destroying fungus, which probably produces the dark stain. Fig. C. Large brown area along a fold, showing white mycelium of a wood-destroying fungus and a black spot due to the large surface production of brownish and greenish-black mold spores. Fig. D. Clean irregular spot along a fold, bounded by a dark gray area containing small, round black spots, probably due to two species of mold. Fig E. The white mycelium of a wood-destroying fungus growing on the inside of a lap of infected pulp. Fig. F. Small, dark brown spots probably due to a mold.*

permeate the pulp and have the power of dissolving the wood fibre and eventually reducing it to a friable, or crumbly, mass which may present a bleached or a browned appearance, depending on the organism present and the residues it leaves behind.

The fruiting stage of wood-destroying fungi is rarely seen in pulp, but if infected laps were exposed to the right conditions of air, and in some cases light, fruiting bodies of definite form would develop on the exposed surfaces. These fruiting-bodies are what we have in mind when we speak of mushrooms, toadstools, conchs, brackets, etc., and are formed for the sole purpose of producing seed-like bodies termed spores, which have the capacity of germinating under favorable conditions of air and moisture to reproduce the vegetative stage of the fungus which causes the real destruction in the pulp.

*Fig. V. Showing the natural size, the fan-shaped patches of white Mycelium of a wood-destroying fungus*

Infection of sound wood or pulp by wood-destroying fungi occurs in three ways:

1. By spores which are produced on fruiting bodies, and which blow about and lodge on the material.

2. By another type of spores, occurring directly on the mycelium of some of the wood-destroyers, which functions the same as the spores just mentioned. These spores may also be readily distributed by the water used in the manufacturing process.

3. By direct overgrowth of mycelium from one piece to another, due to contact.

The wood-destroying fungi which are to be found in pulp may be the same species which are found in the pulp wood before grinding; in other cases they may have been introduced after storage.

The second class of fungi, which we term "molds," differ from the wood-destroying fungi in not actively attacking the wood fibre and hence are far less important in reducing yields. They are very conspicuous, however, usually much more so than the wood-destroyers as they produce very marked discolorations varying from bright hues to browns and blacks, which contrast markedly with the nearly whitish background of the pulp.

These "molds" belong to the "lower fungi," *i. e.*, those forms which produce no large definite fruit-bodies comparable to the mushrooms or conchs of wood-destroyers. The vegetative stage is quite similar in appearance to the wood-destroyers. The mycelium, however, is very often covered with masses of spores, often colored, which may give a powdery appearance to the spots or affected areas. The wood-destroyers never produce colored spores on the mycelium. Where spores are present they are always colorless and usually so scattered that they produce no powdery effect.

To the inexperienced it is not always possible to discriminate between the mycelium or vegetative stages of molds and wood-destroyers in pulp, but the helpful characters may be summarized as follows:

| Molds | Wood-destroyers |
|---|---|
| 1. Do not cause marked deterioration in the strength of the pulp. | 1. Cause marked deterioration in the strength of the pulp, particularly in the advanced stages of growth. |
| 2. Produce discolorations in scattered spots or small patches, varying from pinkish to green, yellows, browns and blacks. | 2. May or may not discolor the pulp, but if so, are likely to be brown and in comparatively large continuous patches due to the spread of the mycelium; more likely to be at the exposed edges of the laps. |
| 3. The discolored spots or areas are often powdery in appearance due to large numbers of spores borne on the mycelium. | 3. Infected areas not powdery in appearance. |
| 4. Mycelium, where in evidence, is usually interwoven and cottony in appearance, never compacted into membranous or fan-shaped sheets or strands. | 4. Mycelium may be fluffy and glistening, but more usually compacted into membranous sheets or strands which are usually white to yellowish or brownish. In the "red-rust" we get yellowish, fan-shaped areas or strands, which are finer and radiately fluffy at the growing margin. |

As before mentioned, some of the molds produce powdery masses of spores on the surface of the pulp, making very showy spots. There are others, however, which grow inside the lap, apparently producing no spores externally but giving a distinct and characteristic discoloration to the pulp.

The most familiar of the molds producing abundant spores on the surface of the pulp is the so-called "sooty mold." There seem to be several fungi producing dark colored spores which are all designated by this term. Upon examination of "sooty pulp" with a hand lens, one is almost always able to readily distinguish brownish-black and greenish-black varieties of molds.

There are at least two other species of molds which produce a gray to black discoloration of the pulp. One of these produces irregular, scattered areas, the other fine, dark gray or black wavy lines.

Still another mold produces dark brown, round,

definite spots from an eighth to a half inch in diameter. No spore production has been observed on the surface of these spots.

There are similar spots with sharply defined black margins and also somewhat smaller, jet-black spots. Both the brown and black spots may extend through or only part way through the lap. The brown spots have been found by splitting apparently clean pulp.

Rather inconspicuous types of pinkish-cinnamon colored areas are frequently found in stored pulp. There seems to be no surface fungus growth but the spots are apparently produced by a light pinkish mold.

Very little beyond the generalization given, is known concerning the action of molds upon the pulp fibres. Investigators disagree concerning the production by them of enzymes which act upon the cellulose. However, according to a rather recent author* some bacteria and filamentous fungi do "dissolve" cellulose to a certain extent. About twenty cellulose-destroying fungi were identified by this investigator. Among these, *Penicillium pinophilum*, which has been frequently isolated from pulp, was found to produce a very active cystase, an enzyme which acts upon cellulose. *Aspergillus niger*, which likewise occurs in stored pulp, was also among the thirty-nine molds tested which gave positive results.

Accepting these results, we should expect to find that at least some of the other species of molds so frequently found on pulp are also to some extent active in destroying the cellulose.

Figures A to F, inclusive, represent typical examples of molds and wood destroyers present in the shipment of infected pulp.

## Experimental Study of Groundwood Pulp Deterioration

Three series of tests have been started to determine the value of the addition of antiseptics to fresh pulp. For the first series, thirty-six antiseptics were used. Twenty-five and fifty cubic centimeters, respectively, of the solutions were sprayed on two sheets of pulp approximately 12x12 inches. Half of these were inoculated with a water suspension of the spores of eight molds and two wood-destroying fungi, which were originally obtained from infected pulp. These sprayed sheets, together with some unsprayed sheets, were then placed in a humidity chamber to await developments.

The second series of experiments was similar to the first but a larger amount of pulp was sprayed with each antiseptic. Sixteen or twenty sheets of pulp, approximately 24x12x1/8 inches, were used. Half of these were pressed in a hand press after being sprayed. After inoculation the sheets were also piled in the humidity chamber. Twelve antiseptics were used..

In the third series, some pulp was sprayed with six different antiseptics, as it went over the wet machine. The laps thus prepared were then taken from the press roll, inoculated and also piled in the humidity chamber.

Altogether, tests are under way using thirty-seven different antiseptics. The results of these tests will be published at a later date.

## Remedial Measures

In a consideration of the fungus problem with relation to stored pulp it should always be kept in mind that the conditions which permit the development of the molds will also allow the growth of wood-destroying fungi, so that any measures taken to control one class will in general assist in the control of the other.

Sanitation is the big factor in controlling the development of molds and wood destroyers at pulp storage yards, just as it is in the case of controlling any fungus infection.

This sanitation should preferably begin in the selection of trees for pulping, as only sound trees can produce a first-class pulp.

It would be preferable to maintain as low a reserve of wood in the yard as possible in order to avoid infection of the wood. Peeled wood will suffer less from insect attack than wood in the rough. For woods for chemical pulping, the chipping, drying and baling of the wood would, no doubt, tend to avoid infection with subsequent decay.

The wood storage yard should be well drained.

Freshly cut wood should never be piled on top of the supply on hand. The practice of dumping the fresh material in a heap on top of old wood, forms an ideal hot-bed for the growth of wood-destroying fungi and molds. It would be well worth the added expense to pile each new supply of wood separately, on foundations which should preferably permit of ventilation throughout the pile.

The yard should be kept clean of all waste, and weeds should not be allowed to grow up around the foundations shutting off the ventilation.

But even after every precaution has been taken up to the actual production of pulp, sanitation must not then be neglected. The moisture conditions in the piles of pulp laps are ideal for the germination and growth of fungus spores; hence, old infected pulp left in the yard should be removed from the vicinity of the new piles to prevent further infections. It might also prove advisable to spray the ground on which old infected pulp had been piled, with an antiseptic, before using the same space for the piling of fresh pulp.

Although spraying the laps of pulp as they are placed in storage might check fungus attacks somewhat, the best method seems to be to spray the toxic substance on the pulp as it goes over the wet machine. In this way the antiseptic is evenly distributed throughout the lap.

*Scales, Freeman M. "Some filamentous fungi tested for cellulose destroying power." Bot. Gaz. 60:149-153. 14 Au., 1915.

# The American Pulp and Paper Mill Superintendents' Association News

**Be Sure to Attend the Fall Meeting of the Association at the Congress Hotel, Chicago, Nov. 6-7**

## The Wausau Meeting

The second meeting of the Northwestern Division was held at Wausau, Wis., on Oct. 4. R. J. Cunningham, chairman of the division, presided over the morning session at the Elks' Club. The address of welcome was made by Leonard E. Blackmer and responded to by W. A. Kelly, of the Marathon Paper Co.; Frank Monaghan, of the Wausau Sulphate Fiber Co., and F. C. Boyce, of the Wausau Paper Mill Co. The first order of business was the report of the secretary of the divisional activities, followed by the reading of communications from Otto Kress, of the Forest Products Laboratory, and Henry Bert, of the Downing Box Co.

D. F. O'Connell, of the Northern Paper Mills, chairman of the Sulphite Committee, then presented a very valuable paper on "The Pulping of Hemlock Wood," which is published in full in this number. This paper is the most instructive piece of literature on the subject of sulphite pulp that has been made available to the pulp and paper industry in many years. That its value was thoroughly appreciated by the pulp and paper mill superintendents present was clearly evidenced in the general discussion that followed. In this discussion the salient points brought out by Mr. O'Connell were further developed by D. B. Davies, Munising Paper Co.; A. T. McFarlane, Green Bay Fiber & Paper Co., and Paul Sievert, of the Marinette & Menominee Paper Co., the Sulphite Committee members.

Owing to important business, Henry Bert, chairman of the Box Board Committee, was unable to attend the meeting. The presentation of his paper was therefore delegated to Peter J. Massey, the secretary-treasurer.

Any paper on a subject so little represented in paper-making literature as the manufacture of boxboard would have been gladly welcomed, but Mr. Bert's paper, "A Standard Chip Board," was so full of valuable information and ideas, expressed in his own inimitable style, that it merited every bit of the interest with which it was received and the applause it occasioned.

The Northwestern Division is, indeed, to be congratulated upon being presented with two such important papers on paper manufacture at one meeting. This surely proves beyond dispute that the membership is not only interested in the activities of its committees, but that all the superintendents who attend the meetings of the American Pulp and Paper Mill Superintendents' Association receive something that will be of value to both themselves and the companies they represent, for in the last analysis it is the company that profits most by the development of their representatives.

Another very important matter, especially at this time, was the general discussion on industrial relations after the division had been addressed on this subject by W. T. Fogarty, of the Northern Paper Mills, and John E. Mulchaey, of the Grandfathers Falls Paper Co. In these addresses and the general discussion that followed many new ideas on this important matter were carried away by the superintendents who were present and will be invaluable to them should occasion arise.

A motion by E. Shields, of the Green Bay Fiber and Paper Co., and seconded by J. Mericle, of the George Whiting Paper Co., that the Division extend a vote of thanks for the papers presented, was unanimously adopted and the secretary was instructed to inform Mr. O'Connell and Mr. Bert of the action taken by the Division.

Chairman Cunningham appointed the following members as a committee to determine the date and place of the next meeting and make all the preliminary arrangements therefore: Joseph Mulchaey, of the Flambeau Paper Co.; W. T. Fogarty, of the Northern Paper Mills, and Earl Sharpless, of the Menasha Printing and Carton Co. The morning session was then adjourned.

After luncheon at the Hotel Bellis they started on a tour of inspection of the three paper mills in this vicinity, representative of the most advanced and progressive in the methods and equipment used in their respective branches of paper manufacturing. The first mill visited was that of the Wausau Paper Mills Co., manufacturers of all kinds of wrapping papers. W. L. Edmonds, president and general manager of the company, received the party on their arrival and extended them the freedom of the mill and an invitation to call again and call often.

The condition of the roads did not allow pleasant driving to Rothschild, so the trip to the Marathon Paper Co. was made by trolley. Owing to the absence of D. C. Everest, the general manager of the company, Walter Alexander, vice-president, acted as the host to the superintendents and gave them a hearty welcome. The trip through the home of "Marathon

*(Continued on Page 540)*

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## BELOIT IRON WORKS

**Beloit, Wisconsin, U. S. A.**

# T. A. P. P. I. Meeting at the National Exposition of Chemical Industries

THE Technical Association of the Pulp and Paper Industry held its very successful meeting at the Chemical Exposition in Chicago, September 24 to 27. The large turnout of members to this meeting was gratifying, indeed, and the reception given them by Thos. H. Savery and his Committee of Arrangements made every one present feel more than repaid for having attended.

The meeting was opened at 10 a. m. Wednesday, September 24, in the First Regiment Armory, with Pres. Raymond S. Hatch presiding. The address of welcome was delivered by James L. Carey and responded to by R. S. Kellogg.

Martin L. Griffen presented the report of the Soda Pulp Committee and there was considerable discussion and debate on the various points brought up in this address. The paper by Prof. Ralph H. McKee on "Sulphite Liquor" was not presented, owing to some important business that prevented Prof. McKee from attending the meeting. Mr. Walter H. Dickerson was called upon by Pres. Hatch to cover this subject. Mr. Dickerson gave a short resume of the various efforts that have been made for the utilization of this substance and several new developments that were now being worked out. The meeting was then adjourned until 3:30 p. m.

At the afternoon session Dr. Otto Kress, of the Forest Products Laboratory, presented a paper on "Wood Destroying Fungi" and passed around photographs of various fungus growths, spores and molds in wood pulp, also samples of paper made from infected and uninfected pulp. Dr. Kress received considerable applause on his admirable address. Henry E. Fletcher, the grandad of the Technical Association, made a motion that the association assist in every way possible the Forest Products Laboratory in the very important work it was conducting for the interests of the paper industry. The motion was seconded and adopted unanimously.

The report of the Abstracts Committee was then made by the chairman, Ross Campbell, and was followed by the reports of the Bibliography Committee, Henry E. Surface, chairman; the Heat, Light and Power Committee, Edward P. Gleason, chairman, and the Sulphite Committee, Herbert G. Spear, chairman. The meeting was then adjourned.

In the evening the banquet was held at the Union League Club, with the Hon. John Strange as toastmaster and 130 guests. The speakers for the occasion were W. E. Worth, Raymond S. Hatch, O. Bache-Wiig, Henry E. Fletcher and Thos. H. Savery.

Thursday morning the report of the Vocational Education Committee was presented by the chairman, George E. Williamson. While this was one of the most important reports presented at the meeting, it did not receive as much consideration as some of the other committee reports. It was indeed surprising to the writer that the general membership could show such apathy and disinterest to a committee report on such an important subject to the whole industry as Vocational Education.

The members as a body did not seem to realize the enormity of the work that these men have undertaken, or grasp the fact that this committee has already accomplished a wonderful task. Starting out with no precedent and no previous work along these lines to guide them, they have compiled a complete series of text books on paper making and are now almost ready for the printing.

It was a feeling of genuine regret that so little interest was shown in this important matter and the discussion left entirely with the committee members, even after several direct appeals for suggestions. In justice to this committee I cannot help but express the conviction that if the general membership does not change its attitude toward and its disinterest in this very important subject, the same feeling is bound to be reflected in the balance of the industry and the necessary funds to carry this essential work to completion will not be forthcoming.

The association was the guest of Sears-Roebuck Co. at luncheon, and the afternoon was given over to an inspection of the various departments of "the largest mail-order business in the world," including the paper mill department. At 7 p. m. the paper by Dr. R. J. Blair was presented at the Coliseum on "Decay Prevention of Pulp and Paper Mill Roofs." The association then journeyed to a smoker at the Union League Club.

On Friday the association inspected the Forest Products Laboratory at Madison, Wis., where the great work that is being carried on by this branch of the government service was explained in detail by the heads of each department visited. Addresses by Miss E. Gerry on "The Structure of Wood," O. M. Miller on "The Government and the Forests," and John Newlin on "Box Testing" were presented, after which the association left on its return trip to Chicago.

All day Saturday was devoted to visiting the exhibits at the Chemical Exposition, as there was no further business requiring the deliberations of the association.

*(Continued on Page 545)*

Ash handling has been simplified in the plants of the Bryant Paper Company, Kalamazoo, Michigan.

**AMERICAN**
**STEAM ASH CONVEYORS**

are installed in all five of their mill power plants. The reason why is fully explained in catalogue P. Free on request.

**American Steam Conveyor Corporation**
*Ash Disposal Engineers*
CHICAGO: 326 West Madison Street
NEW YORK: 110 West 40th Street
*Sales Engineering Offices in Principal Cities*

ELBERT HUBBARD II landed from a M. C. train at our shabby station in Kalamazoo, and came out north of the city where all things are spick and span for the manufacture of clean paper.

He SAW the plant—which he had visioned with the mind's eye—and rejoiced with boyish exuberance. What he saw is set down in a mighty meaty book. Cy said we could have some of them soon. Do you want a copy? Then please put in your bid. It's free.

**Kalamazoo**
**Vegetable Parchment Company**
KALAMAZOO, MICHIGAN
*"World's Model Paper Mill"*
Makers of Bond and Waxed Paper and Vegetable Parchment

KVP

IMPORTED **TALC** DOMESTIC

We are also Headquarters for:

BLACKS
COLORS
FILLERS

**BINNEY & SMITH CO.**
81 Fulton Street New York

**STORM & BULL, Inc.**
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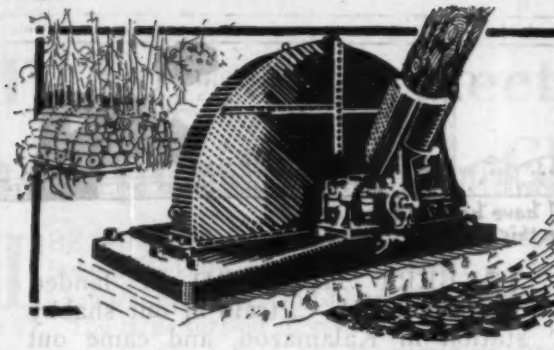
**EXPORT**
*All Grades of*
WRITING BOOK
NEWS WRAPPING
**PAPERS**
OFFERS SOLICITED

**WE-FU-GO AND SCAIFE**
**WATER**
PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES
WM. B. SCAIFE & SONS CO., PITTSBURGH, PA.



# Chips of Information

## Portable Power Pipe Threader

It has often occurred to many users of hand pipe threading tools that if they could be driven by power and still be easily portable their effectiveness would be multiplied many times, and the owners of these tools, by purchasing an efficient power drive, would have the ideal outfit for cutting and threading pipe.

With this thought in mind, the inventor, Mr. W. W. Vosper, has produced the electrically operated mechanism herein illustrated.

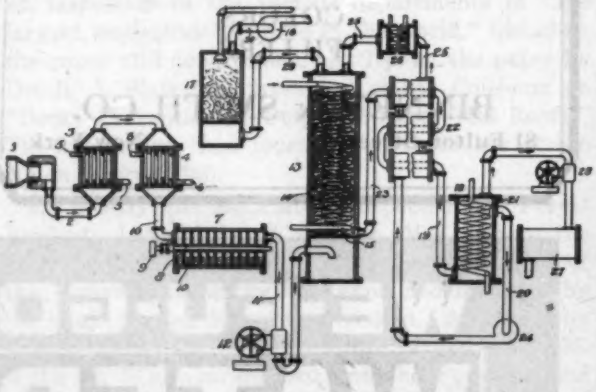
In these days of high labor costs, it is interesting to note that a 12-inch thread that would take two hours to cut by hand, can be completed by the same tool, operated by power, in not to exceed fifteen minutes.

One and one-half H. P. motors are specially designed either A. C. or D. C. and of the required voltage. Each outfit includes twenty feet of flexible stage cable for connecting up with the power lines. The "Drive" is started and stopped by a simply designed push-button switch. There is a two-speed transmission gearing and the change is made by merely pulling out or pushing in a knob. The complete weight of the drive is 231 pounds, but it is so nicely balanced on its wheels that the head may be lifted and attached to the threading tool with practically no effort. It makes no difference whether the tool to be driven is a foot from the floor or five feet from the floor, the "Drive" may be attached with equal facility or it will operate equally well, tilted up on one wheel or suspended in the air by a rope. It overcomes the changing position of the driving pinion of the various tools by simply running back and forth on its own wheels. It is positively uncanny to see the way this willing worker takes care of itself under varying conditions. There are no universal joints or chains or other cumbersome mechanism. No change whatever required to be made in the tools to be operated by this "Drive." Simply put on the power drive instead of working the tool by hand.

---

## Method and Apparatus for Recovering Sulfur Dioxid

A process of separating and recovering sulfur dioxid from the gaseous products of combustion of a sulfur-bearing material, which consists in separating said sulfur dioxid from the other gases by absorbing or dissolving it in a liquid non-aqueous absorbent, and then extracting and recovering said



sulfur dioxid from such absorbent, has been invented and patented by Hugh K. Moore and George A. Richter, and assigned to the Brown Co.

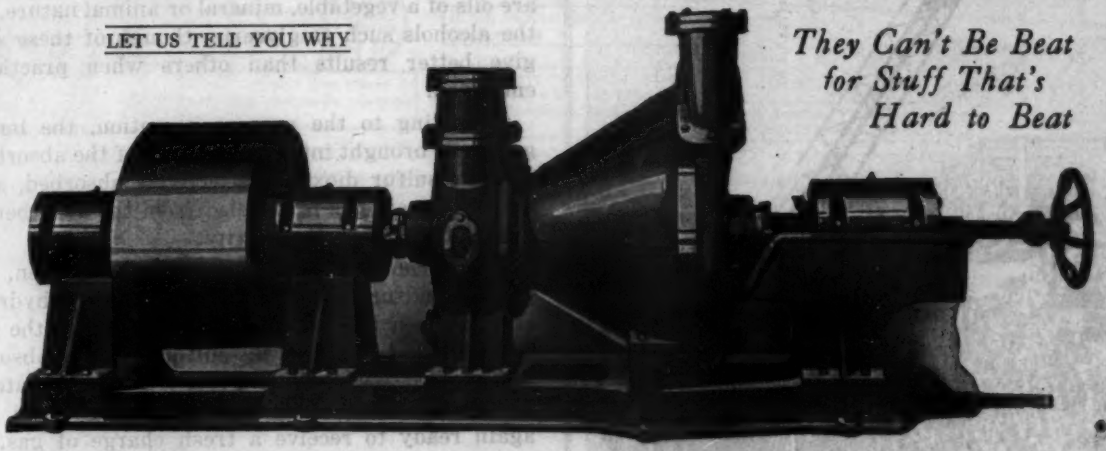
This invention relates to the production of sulfur dioxid and has for its object to provide a method and apparatus for separating substantially pure sulfur dioxid from the products of combustion from a sulfur-burning furnace.

TO PRODUCE A FINE, SMOOTH, STRONG, UNIFORM STOCK USE

# Claflin Continuous Beaters

LET US TELL YOU WHY

*They Can't Be Beat for Stuff That's Hard to Beat*



*THEY ARE THE IDEAL EQUIPMENT FOR*

Rope Manilla — Leather Board — Sulphite Screenings
Wall Board — Kraft Paper — Waste from Pulp Stones

CLAFLIN ENGINEERING CO., Lancaster, Ohio

THE CANADIAN FAIRBANKS-MORSE CO., Ltd., *Agents for Canada*

# SIMONDS

## Barker Chipper and Paper Knives

For 87 years Simonds Manufacturing Co. has been making knives that insure the greatest cutting efficiency. Uniformity of temper and hardening, backed by Simonds Crucible Steel, make them Standard of Quality.

We manufacture machine knives for various purposes, including Barker Knives, Chipper Knives, Rag Knives, Paper Knives and Circular Cutters.

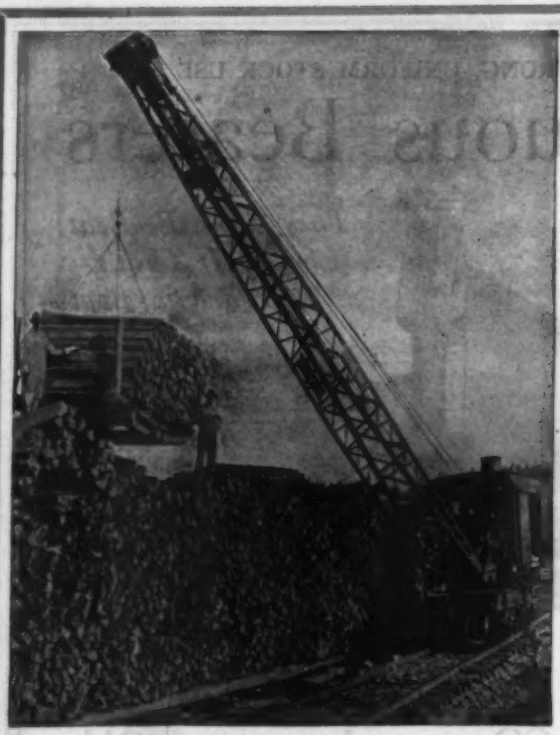
Consult us about your cutting problems.

## Simonds Manufacturing Co.

*"The Saw Makers"—Established 1832*

FITCHBURG, MASS.

CHICAGO, ILL. — NEW YORK CITY — PORTLAND, ORE. — LOCKPORT, N. Y.
NEW ORLEANS, LA. — SAN FRANCISCO, CAL. — VANCOUVER, B. C. — LONDON, ENGLAND
MONTREAL, QUE. — MEMPHIS, TENN. — SEATTLE, WASH. — ST. JOHN, N. B.



## Handling Materials at the Mill

IS YOURS one of the many mills which handles considerable pulp? Some of these have found it to be more rapid and economical to do this handling with a Brownhoist locomotive crane. A Brownhoist will not only place the pulp wherever it is needed, but will handle your coal, switch the cars and take care of innumerable jobs which come up around the yard. If you have much handling to do, our long crane experience should be of use to you. We will gladly give you any information for the asking.

*The*
**Brown Hoisting Machinery Co.**
*CLEVELAND, OHIO, U. S. A.*

*Engineers and Manufacturers of Heavy Dock Machinery Bridge Cranes, etc., as well as smaller Cranes and Hoists*

Branch Offices in New York, Pittsburgh, Chicago and San Francisco.

It has been discovered that there are certain liquid substances containing no water, which, while inert in respect of sulfur dioxid, are capable of dissolving or absorbing the gas to the practical exclusion of nitrogen and other products resulting from the combustion of sulfur in air. Among these substances are oils of a vegetable, mineral or animal nature, and the alcohols such as glycerin, though of these some give better results than others when practically employed.

According to the present invention, the burner gases are brought into the presence of the absorbent, and the sulfur dioxid is selectively absorbed, after which the said gas is expelled from the absorbent in a state of comparative purity.

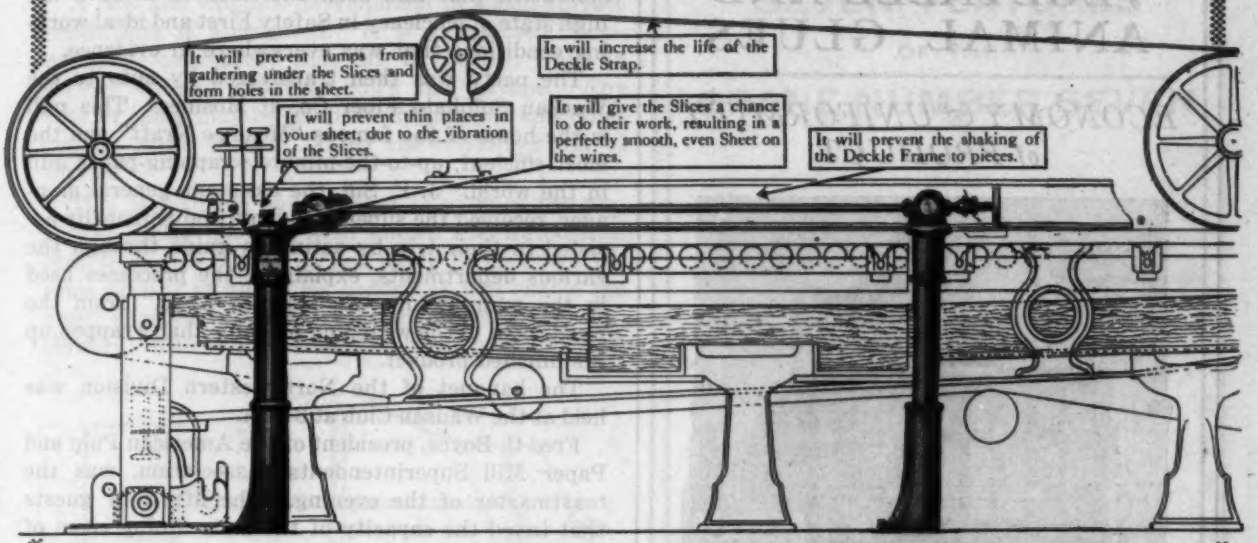
The burner gases, which comprise nitrogen, oxygen and sulfur dioxid, are first dried or dehydrated and are then brought into the presence of the non-aquous liquid by which the sulfur dioxid is absorbed or dissolved, and the liquid is subsequently heated to drive off the gas, after which, on being cooled, it is again ready to receive a fresh charge of gas. In practice, the liquid absorbent is circulated through a charging tank in which the gas is absorbed thereby, and then through a discharging tank in which the gas is discharged, the absorbent being alternately refrigerated and heated. We find it economical to pass the absorbent through a heat exchanger by which the gas-free stream of absorbent on its way to the charging tank is cooled, and the gas-charged stream on its way to the discharging tank is preliminarily heated. The gas liberated in the discharging tank is collected and preferably though not necessarily recovered in liquid form.

Referring again to the absorbent—it should have certain characteristics to secure optimum results, e. g. the liquid must contain no water, it must neither freeze nor vaporize easily, must not readily break up when heated, and should not readily foam. We have found that unsaturated oils of a vegetable origin have given the best results, especially those containing relatively large proportions of the glycerids of the fatty acids lower in saturation than olein, such as soya bean oil and cottonseed oil, preferably "winter oils" from which a portion of the glycerids of the saturated acids have been expressed. Before use the oil should be carefully dehydrated, and it then may be used for a relatively long time.

By employing an absorbent containing no water and dehydrating the gas, sulfur dioxid may be commercially handled with as little effect upon the containing tanks and conduits as air, and consequently, instead of forming these instruments of lead, bronze or other expensive material, they may be made of iron or other inexpensive substance. Again, by employing a liquid solvent, such as herein described, it does not have to be heated to the same extent as does water or an aqueous solution in order to expel the gas.

# The Acme Deckle Frame Support

*"is indispensable to the making of Good paper"*


It will prevent lumps from gathering under the Slices and form holes in the sheet.
It will increase the life of the Deckle Strap.
It will prevent thin places in your sheet, due to the vibration of the Slices.
It will give the Slices a chance to do their work, resulting in a perfectly smooth, even Sheet on the wires.
It will prevent the shaking of the Deckle Frame to pieces.

*It will make better edge, save breaks and take less power.*

*Manufactured and Distributed by*

**HUBAND & NASH**

**Menasha, Wis.**

*Most of the best mills in this country are equipped with this device.*

# *Northern Paper Mills*

"The Standard of Excellence"

"Northern" Toilet Papers

"Northern" Inter-Folded Towels

"Northern" Roll Towels

CAPACITY 100,000 LBS. PER DAY

*NORTHERN PAPER MILLS, GREEN BAY, WIS.*

# "American" VEGETABLE AND ANIMAL GLUES

*ECONOMY & UNIFORMITY of PRODUCT*

The **Real Test** for Pastes, Glues, or other adhesives lies in their **Performance** under your own operating conditions and the **Results** achieved in your finished product.

Give us an idea of your requirements and conditions, and we will furnish you with the Best Adhesive to meet them.

**"AMERICAN" Glues for Container and Box Board.**

"ROLLEO" Book Glues for Bindery.

"AMERICAN" Pastes for Mailing.

"FLEXO" Padding Glues.

"AMERICAN" Liquid Glues for Box Board and Other Purposes.

"GOO-GOO" Make Ready Pastes for Pressroom.

"AMERICAN" Flexible Glues for Flexible Bindings.

"AMERICAN" Rollers Mean Pressroom Efficiency.

*We guarantee that our rollers will fulfill your requirements satisfactorily or cost you nothing. Give us a trial order on these conditions.*

**American Printers' Roller Mfg. Co.**

**Grand Ave. and Franklin St., Chicago, Ill.**


(*Continued from Page 532*)

Bond" and other "Marathon" specialties was a most interesting experience. Of especial interest in this up-to-date mill was the amount of thought and consideration that had been exercised to achieve the high state of efficiency in Safety First and ideal working conditions that was everywhere in evidence.

The party was then transferred by auto to the Wausau Sulphate Fiber Co. at Mosinee. This mill is the home of the famous "Mosinee Kraft" and the most efficient, up-to-the-minute wrapping-paper mill in the world. J. P. Sill, the assistant general manager, received the superintendents and personally assisted in their trip by acting as guide through the various departments, explaining the processes used in the manufacture of "Mosinee Kraft" from the wood room to the wrapping machine that wrapped up the finished product.

The banquet of the Northwestern Division was held at the Wausau Club at 8 p. m.

Fred C. Boyce, president of the American Pulp and Paper Mill Superintendents' Association, was the toastmaster of the evening. The fifty-four guests that taxed the capacity of the main dining room of the Wausau Club were entertained by the Tenth Infantry Orchestra and several vocal selections. In introducing the first speaker of the evening the toastmaster touched upon the importance at this particular time in our history that all superintendents make a close study of the needs and ambitions of both the workmen who were working for him and the stockholder whom he is working for in order that they may be enabled to formulate their decisions with justice and impartiality to both sides, thereby preventing the overthrow of reason by the disciples of chaos.

W. L. Edmonds, general manager of the Wausau Paper Mills Co., gave a short talk on the benefits that are derived by the employer through having his executives take a day off occasionally to get away from their regular grind and meet with other men in the same profession and see how the other fellow is doing his work. He stated that it was his experience whenever one of his executives returns from a trip of this kind it is always with a lot of new ideas and pep. This new life is soon reflected throughout the entire organization and recorded in indelible figures on the production chart.

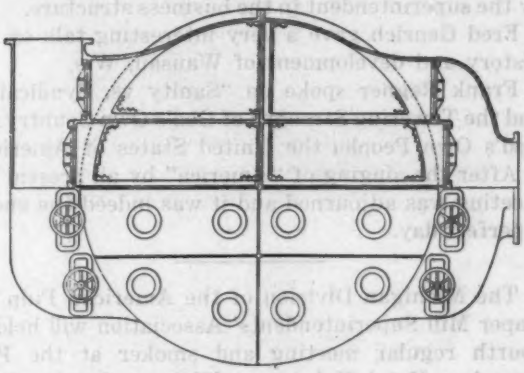
J. P. Sill, assistant manager of the Wausau Sulphate Fiber Co., used as a subject for his short talk the superintendent as intermediary between capital and labor, or the bulwark of business sanity. The superintendent is the man who has all the facts in the case and all the cards in the deck in regard to questions of industrial relations, and is therefore peculiarly fitted to give impartial justice to both sides if he but closely studies all the facts he has at his command. The superintendent knows every indi-

(*Continued on Page 542*)

# Something New and Good in Condensers

A new and valuable development in steam surface condensers is announced. It is a patented "compartment condenser" that can be cleaned while in service without shutting down the turbine. Any tube or tubes may be temporarily plugged and other repairs made without taking the condenser out of service.

This is a timely development in view of the persistent claims made by well known fuel authorities that the price of fuel is not likely to go down for some time if at all. This condenser will enable the chief engineer to constantly maintain clean condensers, hence a constantly high vacuum. All

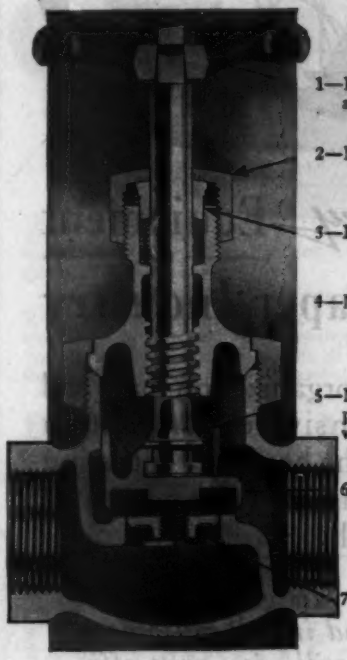


engineers of experience know that in addition to increasing output a high vacuum means low fuel consumption and a considerable saving in money year in year out.

Also upon installation of this condenser there need be no interference with the operation of the turbine. At the present time, in many important power stations, even where water conditions are regarded as good, it is necessary to occasionally shut down the turbine for a period sufficiently long to give the condenser a thorough cleaning. In such cases, and in fact in all cases where continuous and highly efficient operation are desirable, this new type will fill a long-felt want.

To clean the average condenser is not a difficult task, but it is time-consuming, and for that reason the chief engineer is naturally tempted to put cleaning off until "tomorrow," or "next week," or "next month." During his wait for the opportune time the vacuum gradually drops, and with the drop coal wastage increases. Sometimes the loss of vacuum amounts to several inches of mercury. Hence the compartment condenser, which can be kept constantly clean regardless of load conditions, will in the long run prove to be a paying investment from the standpoints of both uninterrupted service and coal saving.


SEVEN FEATURES
OF THE
CRANE NUMBER SEVEN


1—Easily removable malleable iron, non-heat wheel
2—Malleable iron nut
3—Brass gland
4—Malleable iron nut
5—May be packed under pressure when valve is wide open
6—Removable disc holder for quick change
7—Removable nut for changing disc

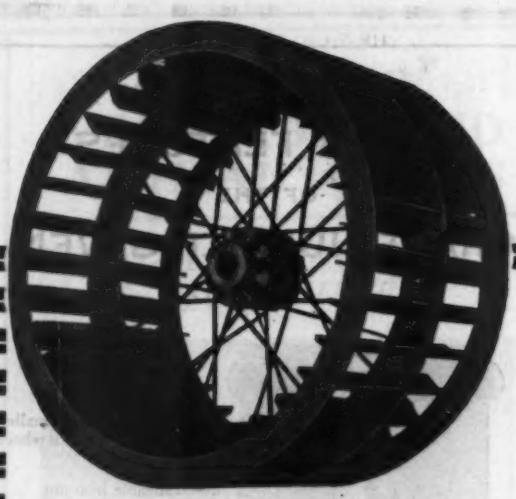
Made in sizes ¼-to 2-inch; for 150 pounds steam working pressure; discs for steam, air and water supplied as ordered. Body, Bonnet, Stem, Disc Holder, Gland, made of Brass.

*Fully described in Circular No. 128 which will be sent upon request.*

1855—CRANE CO.—1919

836 South Michigan Avenue
Chicago

Branches in 53 leading cities



Bayley Equipment
FOR
The Paper Industry

OUR organization has had extensive experience in meeting the heating, ventilating and drying requirements of paper mills.

*We design, manufacture and install equipment which will give most efficient service in your mill.*

Forced and Induced Draft Systems, Pneumatic Chip Ash Handling Systems, Cooling Systems for Electric Generators and for Calenders, Absorption Systems, Forced Ventilating Systems, Dust Collecting Systems, etc., are among the successful applications of Bayley Equipments to paper mill needs.

*An inquiry mentioning your special requirements will bring you interesting information*

**Bayley Manufacturing Co.**
**732 Greenbush St. Milwaukee, Wis.**

*Manufacturers of* Heating, Ventilating, Drying and Conveying Systems.

(*Continued from Page 540*)

vidual member of his organization and the virtues, faults, joys, griefs, ambitions and laxations of each individual. He also knows the needs of capital invested in the business and how these needs are being fulfilled, for it is he who is spending the capital and directing the labor in order to yield sufficient production to pay reasonable dividends on the money he has expended. The superintendent is therefore in a most important position to serve not only the company with whom he is affiliated and the employes that are under his direct control, but to the whole country and all mankind.

Owing to D. C. Everest, the general manager of the Marathon Paper Co., being out of town, L. E. Blackmer was called upon for a short talk. The subject of Mr. Blackmer's address was the association emblem that illustrates so well the position occupied by the superintendent in the business structure.

Fred Genrich gave a very interesting talk on the history and development of Wausau, Wis.

Frank Regner spoke on "Sanity vs. Syndicalism and the Towering Strength of God's Own Country and God's Own People, the United States of America."

After the singing of "America" by all present the meeting was adjourned and it was indeed the end of a perfect day.

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The Michigan Division of the American Pulp and Paper Mill Superintendents' Association will hold its fourth regular meeting and smoker at the Park American Hotel, Kalamazoo, Mich., on October 20, at 6 p. m.

As this will be an open meeting, all managers or other executives are cordially invited to attend and witness the work that the association is attempting to carry on.

There will be two very important subjects in the manufacture of paper upon which papers will be presented at this meeting. Either one of these papers are of sufficient importance to repay you for the time required for your attendance, as they will be presented by two experts in their respective lines and will be as follows: "The Use and Abuse of Rosin Size," by C. W. Rieser, and "Boiler Room Operation in Paper Mills," by George Pfisterer.

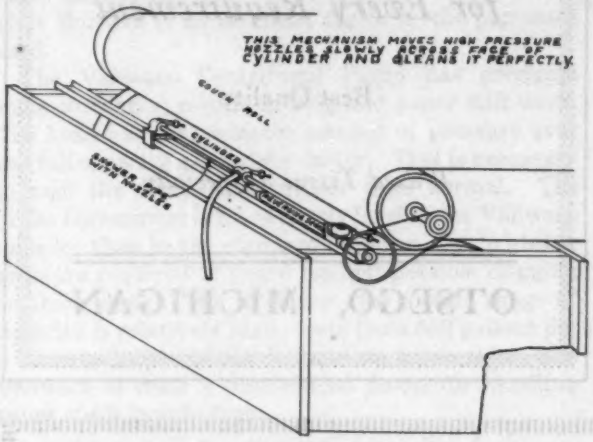
After these papers have been presented and the discussions and questions relating thereto thoroughly covered, the membership will have a general discussion on the subject of printing papers. At this meeting will also be discussed the question as to whether the Michigan Division attend the National meeting in Chicago on Nov. 6 and 7 in a body. Be sure you attend this important meeting and come prepared to state whether it is your wish that the Michigan Division go to Chicago individually or collectively in order to give sufficient time to Mr. Pountain to make the necessary arrangements for transportation, hotel accommodations and other details.

## A New Principle for Shower Pipes

The accompanying drawing is of a new Shower Pipe which is designed to maintain a perfectly clean cylinder face and also save 75 per cent of the water now being used on cylinder faces and Fourdrinier wires in the paper mills.

This device consists of a certain number of high pressure nozzles moved back and forth across the face of the cylinder in place of the regular perforated pipe now in use.

One shower pipe that was replaced, had 241 3/32-inch holes under 20 pounds pressure, where this new shower used three 3/32-inch holes under 75 pounds. The pipe with the 241 holes failed to keep


THIS MECHANISM MOVES HIGH PRESSURE NOZZLES SLOWLY ACROSS FACE OF CYLINDER AND CLEANS IT PERFECTLY
COUCH ROLL
CYLINDER
SHOWER PIPE WITH NOZZLES

the cylinder clean, it being necessary to blow the cylinder out with steam at intervals, whereas the three 3/32-inch nozzles under higher pressure maintained a perfectly clean cylinder with about 25 per cent of the water.

The advantages of a clean cylinder face or wire need hardly be mentioned to a paper maker. In the pulp mill it eliminates a considerable amount of trouble in addition to making a very much better looking sheet of pulp and one which folds without breaking. On a cylinder machine it is, of course, positively necessary to have clean cylinders in order to make paper at all.

Every gallon of this surplus water carries away with it a certain amount of stock even where the best "save alls" are used and if 75 per cent of this water is eliminated it will be necessary to run fewer "save alls" with the attendant wear and tear on the machines.

A perfectly clean cylinder face enables a wet machine to handle more pulp. Every bit of dirt on a wire simply prevents so much pulp from adhering to the cylinder and reduces the output of the machine to a very considerable extent. With clean wires the machine always runs to its full capacity. This device runs without attention and will save the pumping of millions of gallons of water.

THE WORLD STANDARD

**The Mullen Paper Tester**

The Adopted Standard of the United States Government, the Freight Classification Committees and the General Paper Trade.

***The Mullen Paper Tester***

Registers the breaking strength in actual pounds per square inch, not in a mere arbitrary scale. Made in various sizes to test all grades of paper goods from the lightest tissues to the heaviest boxboards.

*Send for Catalogue and References*

**B. F. PERKINS & SON, Inc.**

*Sole Manufacturers* HOLYOKE, MASS.

*The*

**C. L. LaBOITEAUX CO.**

Cincinnati Chicago Cleveland New York

TRADE MARK L x QUALITY SERVICE

**PAPER BOX BOARDS**

— FOR —

***Folding Boxes, Set Up Boxes, Paper Cans, Shipping Containers, Etc.***

| | |
|---|---|
| Plain Strawboard | Solid Manila Tag Board |
| News Lined Strawboard | Brown Jute Box Board |
| Book Lined Strawboard | Oak Grained Jute Box Board |
| Plain and Lined Chip Board | Marble Grained Jute Box Board |
| Single and Double Manila Lined News and Chip Board | Pasted Container Board |
| | Bristol Ticket Board |
| | Diamond Wall Board |
| Patent Coated Folding Box Board | Champion All Leather Heel Board |
| Clay Coated Folding Box Board | Also other standard and special grades to order |

## Hall, Ward & Walker
(INCORPORATED)

*We Guarantee*

¶ Standard news with less than 10% Sulphite, a yield of more than 2200 lbs. per cord peeled or prepared wood and at less than 65 H. P. per ton.

¶ Installations made without interruption of manufacture and for time of men and expenses only. No charge whatever unless guaranty fulfilled. License fee 10% of saving made or 20 cents per cord at licensee's option.

**HALL, WARD & WALKER, Inc.**
Sherman Building
WATERTOWN, N. Y.

## Ticonderoga Machine Works
TICONDEROGA, N. Y., U. S. A.
*MANUFACTURERS OF*
WARREN IMPROVED CALENDER DOCTORS
*With Flexible Blades, Universal Adjustment and Control*
(PATENTED)
WARREN IMPROVED PATENT DOUBLE DRUM WINDERS
Patent BALL VALVE Hydrant
Stock Circulating Systems *and*
other Paper Mill Specialties
*SEND FOR OUR BULLETIN*

*H. O. NUMAN*

## Barking Drums

*Green Bay, Wis.*

CHAS. A. DEWING, President
A. G. GILMAN, Vice-Pres. and Gen'l Mgr.
JOHN A. PYL, Sec'y and Treas.
JOHN W. POWELL, Sales Manager

**1919**
**THE RECONSTRUCTION YEAR**

YOUR LINES can be
strengthened by adopting

# Monarch Standardized Lines

**C1S Litho, Label and Music**
**Ideal Enamel**
**Mohawk Enamel**
**Utility Enamel**
**Mastercraft Enamel**

*OFFSET PAPERS:*

**Bulking Eggshell**
**Offset Music**

**Monarch Paper Co.**
**Kalamazoo Mich.**

**3 Paper Machines** **15 Coating Machines**

(*Continued from Page 545*)

over a magnetized pulley. The non-metallic material falls by gravity from the brow of the pulley into a suitable receptacle or onto another conveyor, while the iron and other metallic material is attracted and held firmly against the belt until it is carried to a point where the belt leaves the pulley on the underside and is then discharged.

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Among the many other substances of interest to the paper industry at the Barrett Co.'s booth, such as wood preservatives, etc., was a new sizing agent, Phenanthrene. Samples of paper that were manufactured by Dill and Collins and sized with Phenanthrene were distributed.

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The National Aniline and Chemical Co. exhibited a full line of acid, basic, chrome, alizarine, sulphur, nigrosine and direct colors for the paper maker, some of which have only been made available in commercial quantities during 1919.

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Among the numerous samples displayed by the Monsanto Chemical Works, Chloramine-T was of especial interest to the superintendents who had attended the Green Bay meeting, as this was the substance that Al. Kroes recommended so highly as a substitute for Iodine in safety first and first aid work.

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At the Mojonnier Bros. Co.'s exhibit the most interesting of all their large collection of scientific instruments to the paper maker was the moisture testing apparatus, as applied to pulp, paper and paper products.

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Considerable interest was shown in the Widney Modulimeter for testing thickness, tensile, folding strength, hardness, resilience and elasticity of paper and other materials.

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The Buffalo Foundry and Machine Co.'s exhibit was, as in all previous Chemical Expositions, the largest and most attractive one present. A "Buflovak" Vacuum Dryer, the type that is now being successfully used in recovering the solids from the waste sulphite liquor in the form of a powder, was in operation. Multiple effect evaporators, nitrating and sulphonating kettles and many other large pieces of Buflokast equipment applicable to other industries were on exhibition. The company has not rested its policy on the mere production of machinery; it has taken an advanced position in the industrial world by equipping and developing departments for scientifically adapting its machinery to the needs of the commercial life of the country, and this feature of the organization aroused an unusual interest among the members of the various technical and scientific organizations that were attending the exposition.

(*Continued on Page 549*)

UNLOADING PULPWOOD

**Handle Your Coal and Pulpwood Mechanically with a Byers Auto-Crane**

¶ The rising cost of common labor has caused a large number of paper mills to look for labor-saving devices, and the Auto-Crane has answered the call.

¶ Not confined to tracks, and can go anywhere about your yards. Steam, gasoline or electric power.

*Ask for Bulletin* 1016

*The*
**John F. Byers Machine Company**
**311 Sycamore St., RAVENNA, OHIO**

UNLOADING COAL

# GATTI-McQUADE COMPANY

JOSEPH GATTI, *President*

Established 1894 Incorporated 1898

*Tell Us Your Problems in*

## Paper Manufacturers' Supplies

¶ We have the EQUIPMENT to handle any TONNAGE you may desire.

¶ We are in a POSITION to give you the exact GRADE you require.

¶ Our CAREFUL GRADING assures you of UNIFORMITY.

¶ Our SORTING is done under SANITARY conditions in 2 large MODERN WAREHOUSES.

*Every Standard Grade of*

## Rags, Paper Stock

*Cotton* — **Waste** — *Woolen*

*We also carry a full line of*

Kraft, Sulphite, Manila and Waterproof Wrapping Papers.

Straw, Binders, Chip, Lined and Coated Box Board.

Cotton, Hemp and Manila Cordage.

# GATTI-McQUADE COMPANY

JOSEPH GATTI, *President*

Main Office: 200 Fifth Ave., New York City

WAREHOUSES:

Hoboken, New Jersey, Weehawken, New Jersey

Philadelphia Office: 1416 Wood St.

# Bardeen Paper Co.

Otsego, Mich.

*Printing Papers of Merit*

*For* LETTERPRESS, OFFSET *and* LITHOGRAPHIC PRINTING

Offset Blanks Offset Bristols

Porcelain, Peninsular and Purity Enamel Book

M.F. and S&SC Book and Catalog

English Finish Opaque

Coated Blanks

Post Card Translucent

THE HILL CLUTCH CO.

## YOUR LINE SHAFT EQUIPMENT

Should combine highest efficiency with dependability and low cost of upkeep.

Our complete line of

**Power Transmission Machinery**

is designed to combine strength and efficiency

**HILL** FRICTION CLUTCHES
COLLAR OILING BEARINGS
ROPE DRIVES

*Catalogues Upon Request*

## THE HILL CLUTCH CO.

CLEVELAND, OHIO

New York Office: 30 Church Street

(*Continued from Page 547*)

The success of "Buflokast" and "Bluflovak" equipment rests largely upon the ability possessed by their engineering department to deal effectively with chemical problems. This engineering staff is composed of specialists occupying the foremost positions in their respective fields in the Chemical Industry.

---

The Economy Engineering Co. exhibited a full line of their portable elevating, tiering and handling equipment for paper and paper products, and was a mecca for a large number of the paper men who had paper handling problems to solve.

---

The American Kron Scale Co. had their "Load and Look" Labor Saving Balance on exhibition.

---

Paper makers' clay in every degree of purity and for every purpose, from the crude mine run, through all the intermediate stages to the refined product as used in paper manufacture, was displayed at the booth of the Miner-Edgar Co.

---

As in previous expositions, there was an extensive exhibit of Marden-Orth & Hastings Corp. products. Of particular interest to the paper industry was the full line of acid, basic, direct and chrome colors particularly suitable for paper dyeing.

---

The Devine Co.'s representation consisted of vacuum rotary dryers, vacuum drum dryers and autoclaves.

---

Lead lines iron pipe for sulphite liquor, sulphurous acid proof, was the offering of the Lead Lined Iron Pipe Co.

---

Industrial controlling and recording instruments in all their various manifestations were exhibited by the Taylor Instrument Co.

---

The Union Sulphur Co. offered for inspection samples of brimstone from the Largest Sulphur Mine In The World, situated at Calcasieu Parish, La. The product is known as the highest grade brimstone on the market.

---

Everything in Acid-proof stoneware and brick was the offering of the United States Stoneware Co. This included stoneware pipe, especially suitable for the bleach lines in paper mills.

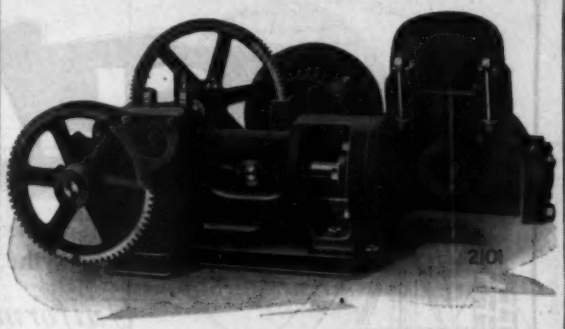
---

The Foxboro Co., Inc., exhibit consisted of a full line of indicating and recording thermometers that were adapted to any operation where accurate knowledge of temperatures is vital. They are known to always stand up and function correctly.

---

Pennsylvania Salt Co. exhibit contained two inter-

(*Continued on Page 551*)

WE CAN furnish this pump equipped to handle any liquid that will flow through a pipe. The wearing parts are all liberally proportioned for the service required. All valves are above the piston and easily accessible by the removal of the water chest cover.

*Send for Catalogue 127*

**DEAN BROS.** STEAM PUMP WORKS **INDIANAPOLIS.**

BOLTON QUALITY

CHIPPER KNIVES BEATER KNIVES BARKER KNIVES BEATER PLATES

*REMEMBER*

**BOLTON QUALITY**

*When it is a matter of*

**Barker Knives**
**Beater Bed Plates**
**Beater Fly Bars**
**Chipper Knives**
**Jordan Engine Fillings**
**Paper Trimming Knives**
**Rag Cutter Knives**
**Rotary Cutter Knives**

*Of every description used in Paper and Pulp Mills*

¶ Designed to meet specific needs and of uniformly High Grade.

**John W. Bolton & Sons, Inc.**
LAWRENCE, MASS.

JORDAN FILLINGS

WESTERN REPRESENTATIVE
Cale B. Forsythe, Kalamazoo, Mich.

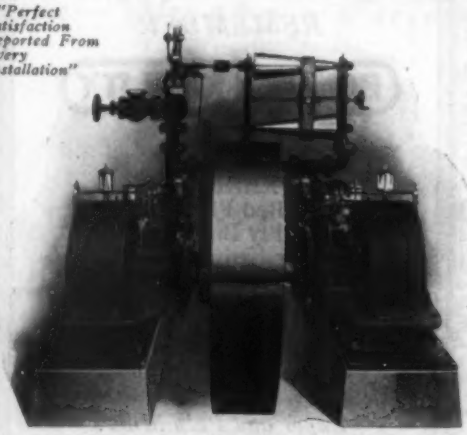
*Uniform Quality*
*Excellent Service*

The John W
HIGMAN
COMPANY, INC.

29 BROADWAY New York, N.Y.

Large, Modern Designed ENGINES

*"Perfect Satisfaction Reported From Every Installation"*



***Economy—Continuity of Performance—Ease of Care and Adjustment—Infrequency of Repairs***

These, the important requirements of an engine, are met by "ERIE" double variable speed engines.

***To the Paper Mill Trade***

We will be glad to furnish full information as to price, delivery and equipment to meet your requirements, and will appreciate an opportunity to furnish these details by mail and the privilege of personal interviews being arranged.

MANUFACTURED BY
**ERIE ENGINE WORKS** *Established 40 Years* **Erie, Pa.**

*Special Sales Representatives*
New York—W. B. Connor, Inc., 90 West Street.
Boston—Schumacher-Santry Co., 141 Milk Street.
Chicago—E. E. Maher, 818-819 Michigan Boulevard Building.

*Largest producers in the world of highest grade Brimstone —guaranteed 99% pure—free of Arsenic and Selenium.*

*The*
UNION SULPHUR COMPANY

*In so far as possible we will be glad to offer advice or suggestions to prospective buyers who are using or may be contemplating the use of brimstone.*

17 BATTERY PLACE
NEW YORK

(*Continued from Page 549*)

esting substances to papermakers, Natrona Porous Alum and Standard Bleaching Powder.

---

Starches, dextrines, gums, albumens, animal and vegetable glues were exhibited by the Stein-Hall Co.

---

The Nash Engineering Co. had on view the Nash Hytor Vacuum Pump and Air Compressor and a Jennings Hytor Dryer Exhaust unit of the type used with paper machine dryer systems.

---

The Glens Falls Machine Works had their extensive Paper Mill line on exhibition and included all of their "Standard" equipment such as the "Standard" Wet Machine, the "Standard" Rotary Sulphur Burners, the "Standard" Split Cams for flat screens and the Wood's Machine or "Standard" Saveall.

---

The Section on Wood Preservation of the Forest Products Laboratory had one of the most popular and most interesting exhibits at the exposition. This exhibit consisted of samples from the research work done by this section on the various types of glues, but more especially of the Casein and Blood Albumin types. Plywood of every description was on exhibition. Extensive research has been done on this and allied subjects and was brought about by the aircraft problems for which specifications were worked out to cover all the glue and water-resistant qualifications of materials for air-craft purposes for the U. S. Government by this section of the Laboratory.

---

The Crane Co. had on hand everything for any pipe line in any service and in any industry, including the paper industry. Valves, pipe fittings and steam specialties made in cast iron, malleable iron, ferrosteel, cast steel, forged steel, brass and bronze were displayed.

---

The Hooker Electrochemical Co. exhibit included Bleaching Powder, Caustic Soda and Liquid Chlorine.

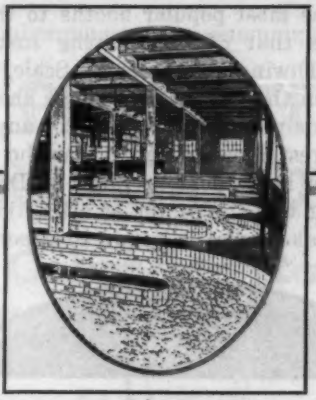
---

The instrument shown was used to test tissue tearing at 20 grams, and all grades of paper up to heavy building paper taking 700 grams to tear it.

It was the opinion of many paper men who saw the instrument demonstrated that it will give very valuable information on the relative strength of paper. Since the force is measured by dead weight, the instrument is not subject to the annoying changes in calibration common to instruments using a spring gauge.

---

The Glaymorgan Pipe and Foundry Co. featured a continuous filter, a vacuum exhauster and a continuous caustic flaker.

High Grade
Bleached
Sulphite Pulp

Furnished in Rolls—75% Air Dried or in Wet Laps

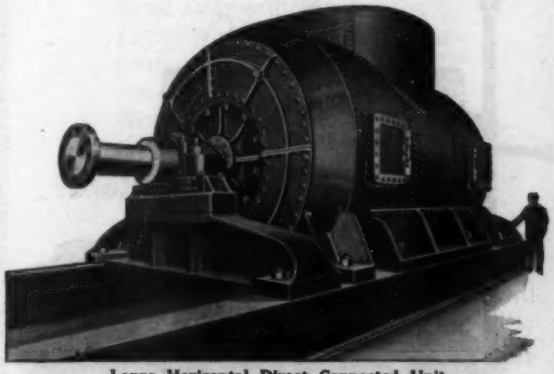
*Write for Samples and Prices*

Eastern Manufacturing Company
501 Fifth Avenue New York
*Mills at Bangor and Lincoln, Maine*

Leffel Turbine Water Wheels

*High Speed — High Horsepower — High Efficiency*

Vertical and Horizontal Designs



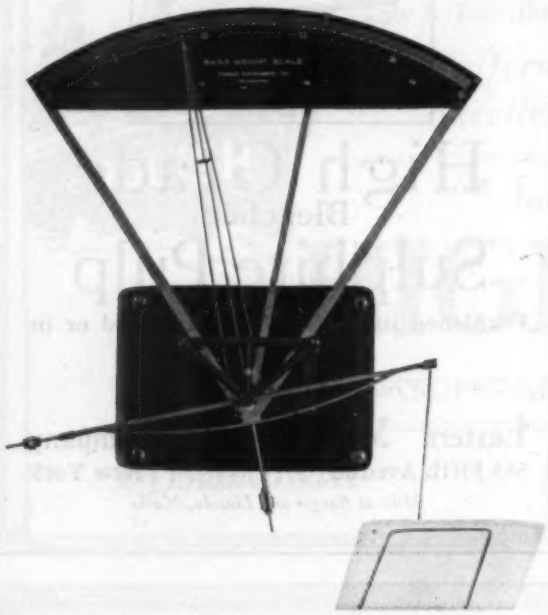
Large Horizontal Direct Connected Unit

*Write for Bulletin 54*

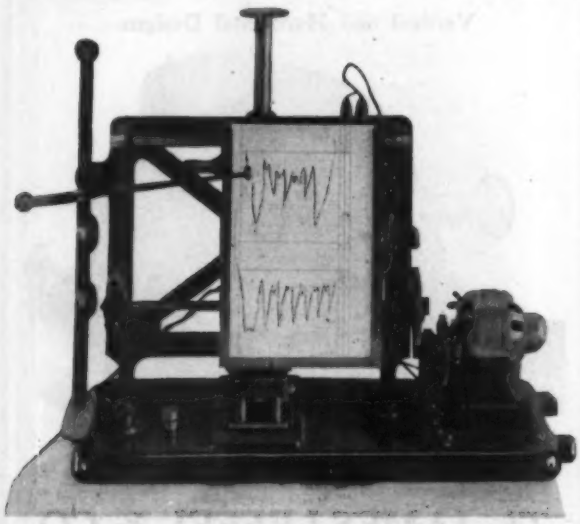
*The* JAMES LEFFEL & CO.
SPRINGFIELD, OHIO

SALES ENGINEERS
B. F. Groff, 556 Woolworth Bldg., Lancaster, Pa.
L. B. Dow, Inc., 79 Milk Street, Boston, Mass.
H. H. White, 1503 Fourth Nat'l Bank Bldg., Atlanta, Ga.
William Hamilton Co., Ltd., Peterboro, Ont., Canada.

One of the most popular booths to the Technical Society was that of the Thwing Instrument Co. While the Thwing Basic-weight Scale, for reading directly from the weight of a single sheet the number of pounds per ream of sheets of any size, had a host of interested paper men, it was the new Thwing Paper Tester being demonstrated by Dr. Charles B. Thwing that was the center of attraction. This instrument makes what is known to paper men as the



tear test, and is the first practical machine to be devised for this very important test on paper. The machine is now in the quantity production stage and



will be available to the whole industry in the near future. The first 5 instruments that have been completed are already sold and delivered to four of the largest mills in America and the Bureau of Standards.

The instrument was devised by Dr. Charles B. Thwing at the suggestion of R. M. Hatch, chairman of the Technical Association of Pulp and Paper Industries, and has been developed and is now on sale by the company of which Dr. Thwing is president.

The instrument has attached a die which cuts a specimen and punches in it a series of triangular holes. When the specimen has been attached to the instrument the motor is started and a series of five short tears are made, each of which is recorded by the pen in grams.

The chart is divided into two sections so that two specimens may be tested, one in machine direction, the other across the machine, and both records will appear on the same chart. Two weights are provided, which may be placed in three different positions so as to record the force directly in grams from 10 grams to 1 kilogram.

---

The improved rotary continuous suction filter of the Glaymorgan Co. received considerable attention from the paper men, as did also the causticizing and recovery equipment by the sulphate and soda men.

---

The C. J. Tagliabue Mfg. Co. displayed a full line of indicating, controlling and recording precision instruments. The "Tag" P. & W. Automatic Liquid Level and Condensate Controllers, and the A. S. Witham, Sr., system of Automatic Temperature Control for Paper Machine Dryers were the featured items at this booth.

---

The Westinghouse Co. had a general line of electrical apparatus applicable to the Chemical Industries.

---

A complete operating installation of a humidifying and constant temperature room with automatic control was the Carrier Engineering Corp. offering and was one of the principal features of the exposition.

---

U. S. Cast Iron Pipe Co. exhibited various special castings and machinery designed for the Chemical Industries. Photographs and samples, showing the value of Cast Iron Pipe in various parts of paper and pulp mill practice and its superiority over other classes of pipe were shown. These included pipe lines for the hot $SO_2$ gases from the sulphur burners and the pipe lines for Bleach Liquor as well as the pipe for the general drainage system of the mills.

---

Oliver Continuous Filter Co. exhibited their Continuous Suction Filter and described its practical application to many of the Chemical Industries.

---

The Revolvator Co. displayed their elevating machinery for Roll and Flat Paper.

---

The Allen Electrolytic Corp. exhibited a model of the Allen-Moore cell for the electrolytic production of Chlorine and Caustic Soda from brine.

Swenson Evaporator Co., multiple effect evaporators and caustesizing equipment.

---

The Brown Portable Conveying Machinery Co., tiering and conveying machinery.

---

The Carborundum Co., grinding wheels for calender rolls, etc.

---

Goulds Manufacturing Co., pumps of every description.

---

Metals Disintegrating Co., bronze powders and other metallic powders for coating paper.

---

Texas Gulf Sulphur Co., brimstone.

---

Zaremba Co., evaporating equipment.

---

Christian Becker, Inc., analytical and specific gravity chainomatic balances.

---

The Refinite Co., water softening and filtration equipment.

---

## Placing the Responsibility in Case of Fire

It no doubt will be of interest for you to know that Portland, Ore., has an ordinance in force, making the citizen or corporation responsible for a fire, due to neglect of fire prevention orders, to pay for the services of the fire department.

Why not make this applicable to the fire fighting organization in your mill?

Whenever a fire occurs in the mill and upon investigation it is found that the department where the fire occurred had neglected the fire rules or had not kept the fire prevention apparatus in the proper condition, that particular department should have charged against its percentage the losses and expense incurred as a result of the fire.

If you are following the up to date method of giving your heads of departments some numerical or graphical value of the efficiency with which their individual departments are operating, in such a form that they will be easily available for the bulletin board and easy of understanding you may make this idea apply to your organization and make it a real factor in fire prevention.

You may rest assured that the workers and executives in each department will not countenance the infraction of the fire prevention rules and will inspect the fire fighting apparatus with real interest as to its effectiveness.


# PERFECT ROLL GRINDING

*of* **Calender Rolls Brass Rolls and Rubber Covered Rolls** *for*

# PAPER MILLS

is an impossibility except to those who have had long experience in this work. We are not only specialists in Roll Grinding, but we

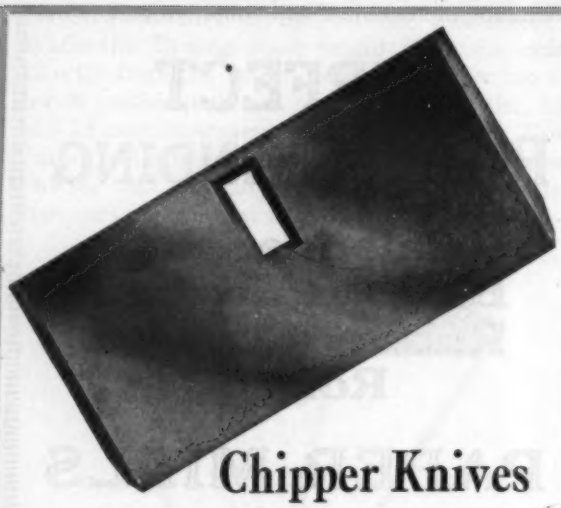
*Absolutely Guarantee Perfect Work*

Tell us what you are making and we will grind your Rolls to give the Best Results. We have two large machines doing this work and can give you Service.

*SEND FOR LIST OF SATISFIED PAPER MANUFACTURERS*

**BEVIS & SHARTLE MACHINE CO.**

MIDDLETOWN OHIO

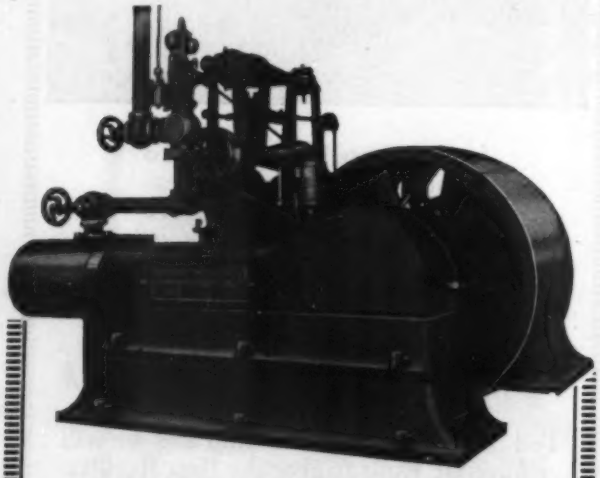


Chipper Knives

When you have trouble—then try WHITE Knives for *then* you will appreciate quality.

*We want to show you once. After that, you judge.*

The L. & I. J. White Co.
85 Columbia Street BUFFALO, N. Y.



Variable and Constant SPEED ENGINES

*Paper Mill Economy* is assisted very materially by the installation of High Grade Variable Speed and Constant Speed Engines.

*Send for List of Installations and Catalogs*

CHANDLER & TAYLOR COMPANY
Indianapolis, Indiana

## Wis. Meeting of the Cost Assn.

The second meeting of the Wisconsin Local Division of the Cost Association of the Paper Industry, which was held at Neenah, Wis., on September 22, was largely attended. A. C. Lashar, of the George A. Whiting Paper Company, Menasha, presided, and representatives from the following concerns were in attendance:

American Writing Paper Co., Holyoke, Mass.
Consolidated Water Power & Paper Co., Grand Rapids, Wis.
Bergstrom Paper Co., Neenah, Wis.
Falls Manufacturing Co., Oconto Falls, Wis.
Fox River Paper Co., Appleton, Wis.
Green Bay Paper & Fiber Co., Green Bay, Wis.
Lakeside Paper Co., Neenah, Wis.
Marathon Paper Mills Co., Rothschild, Wis.
Marinette & Menominee Paper Co., Marinette, Wis.
Menasha Printing & Carton Co., Menasha, Wis.
Neekoosa-Edwards Paper Co., Port Edwards, Wis.
Northern Paper Mills, Green Bay, Wis.
Marathon Paper Mills Co., Wausau, Wis.
Wausau Sulphate Fiber Co., Mosinee, Wis.
Geo. A. Whiting Paper Co., Menasha, Wis.
Whiting-Plover Paper Co., Stevens Point, Wis.
Shattuck & Babcock Co. Division, De Pere, Wis.

The morning session was called to order in the lecture room of the Kimberly High School and the meeting was immediately turned over to W. T. Schmitt, of the Shattuck & Babcock Division of the American Writing Paper Company of De Pere. Mr. Schmitt demonstrated the precedure used by his concern in determining cost, showing their cost forms and using lantern slides in the demonstration with exceedingly good effect. The following points were emphasized in Mr. Schmitt's presentation:

1—Perpetual inventory of material.

2—Requisition on stores covering all material used.

3—Monthly statement showing actual consumption of material determined by a physical inventory, as compared with reported consumption taken from beater orders and requisitions.

4—Broke reports and cross check for each department.

5—Method of arriving at departmental rates.

6—Perpetual inventory of manufactured paper.

A lively discussion followed and Mr. Schmitt answered questions from the floor.

Lunch was served at the Valley Inn, after which the members convened for the afternoon session in the E. F. U. Building. B. E. Hutchinson, treasurer of the American Writing Paper Company, Holyoke, Mass., and who is a vice-president of the National Cost Association of the Paper Industry, spoke at this session on Cost Accounting in general in his usual interesting manner and outlined ways and means for getting the most out of Local Division meetings. At

the conclusion of Mr. Hutchinson's address, round table meetings were initiated for members interested in the specific cost accounting problems peculiar to the manufacture of Writing, Wrapping, Tissue and Sulphate Bond papers respectively.

The consensus of opinion at the meeting was that the two first gatherings of the Wisconsin Local have been successful and very well worth while. Needless to say the meetings will be continued; the place and date of the next meeting to conform to the wishes of the majority expressed through a questionnaire to be sent out for this purpose. Representatives of every pulp and paper mill in the state are eligible for membership and cordially welcomed at all meetings.

## Conn. Valley Meeting of Cost Assn.

The Connecticut Valley Local Division of the Cost Association of the Paper Industry held a meeting at Holyoke, Massachusetts, on September 22, 1919. S. L. Bush, of the Chemical Paper Manufacturing Company, presided, and John N. Hazen, of the Taylor-Logan Company, acted as temporary secretary. Plans were discussed and steps taken to formulate a definite program for the coming fall and winter meetings of the local.

Those present at the meeting enjoyed a lively discussion on the proper handling of administrative expense in cost.

In answer to a question the chairman pointed out that converters of paper were eligible for membership in the Connecticut Valley Local.

Among the concerns having representatives present were the following:

New York-New England Co., Holyoke, Mass.
Parsons Paper Co., Holyoke, Mass.
Valley Paper Co., Holyoke, Mass.
American Writing Paper Co., Holyoke, Mass.
Chemical Paper Mfg. Co., Holyoke, Mass.
B. D. Rising Paper Co., Housatonic, Mass.
Esleeck Mfg. Co., Turners Falls, Mass.
Crocker-McElwain Co., Holyoke, Mass.
Strathmore Paper Co., Mittineague, Mass.
Mars Paper Co., Westfield, Mass.
Taylor-Logan Co., papermakers, Holyoke, Mass.
Erving Paper Co., Erving, Mass.
White & Wyckoff Mfg. Co., Holyoke, Mass.
Newton Paper Co., Holyoke, Mass.
Carew Mfg. Co., Holyoke, Mass.
Hampshire Paper Co., Holyoke, Mass.

## Cranes

Carelessly attached slings on hoisting cranes are often responsible for many accidents due to the falling of the logs or other material being hoisted.

In a Canadian pulp mill the slogan "Attach your sling with Safety First" is painted on the boom of the locomotive cranes and is said to have brought about the practical elimination of accidents from this source.

James L. Carey
*Paper Mill Architect and Engineer*
208 N. Laramie Ave., Chicago, Ill.

ROBERT BLANK
**Paper Manufacturers' Supplies**
*New Cuttings* *Paper Stock* *Rags*
140 Nassau Street NEW YORK

UNION SCREEN PLATE CO.
Fitchburg, Mass., U. S. A. Lennoxville, P. Q., Canada
[redacted]
**UNION BRONZE SCREEN PLATES**
(Best phosphorized Cast Metal)
Old Plates RECLOSED and RECUT to accurate gauge
UNION BRONZE SCREWS for Screen Plates
Immediate Delivery of the Largest Orders. Satisfaction Guaranteed
**The Witham Screen Plate Fastener, Patented**
THE ORIGINAL THE BEST

STANDARD WIDNEY TESTS
How Do You KNOW?
Your contracts call for certain specifications. How do you know you are fulfilling these contracts? Is it anything but a guess?

Thickness; Tensile, Tearing, and Folding Strength; Hardness; Resilience; Elasticity; Stiffness; Smoothness of Surface;—in fact, every physical quality of paper can be measured with the
WIDNEY MODULIMETER
and the exact figures are shown on a dial, immediately. Tests can be made machinewise or crosswise.
You'll find **The Story of the Modulimeter** worth reading. Ask for a copy, today.
The Widney Modulimeter also enables you to determine the Molecular "Life" of Felt, Rubber, Leather, or any material.
To really appreciate this wonderful instrument you must apply it under your own conditions.
Let us show you how to standardize your specifications on any material you use or make.
WWWWWWWWWWWWWWW
THE WIDNEY COMPANY
*Testing Engineers*
Main Office and Laboratories: 352 So. Jefferson St.
CHICAGO

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Cut down *excessive* wrapping paper investment. Why carry two wrapping paper lines for one wrapping paper *purpose?*

**MOSINEE**

presents a perfect wrapping paper, weight and strength for each wrapping purpose. Made in all weights from 15 pounds to 100 pounds basis. The one complete, standardized and economical line of wrapping paper sold.

**Mosinee Kraft**

***"The Wrapper that Delivers the Goods"***


# Aerial Salesmen

Salesmanship, probably the oldest calling in the world, keeps abreast of the times in practically every respect. The first traveling salesmen were probably the ancient Greeks and Jews, who journeyed from Asia and Africa to Rome and Athens to barter their wares, which they packed on their backs, or transported with camels and donkeys from great distances. Christopher Columbus was somewhat of a traveling salesman himself while on his tours of discovery. His ships carried Spanish and Italian goods and fabrics, which he traded to the West Indian and North American Indians for tropical products. And so the traveling salesman has from time immemorial remained one of the leading factors in the phenomenal growth of this country.

Modern inventions—the railroad, automobile, telephone—all have contributed to the progressiveness of the American salesman. And now comes the aeroplane, with its facility for speedy service.

The first aeroplane traveling salesman was started on his tour several weeks ago at New York City, from Eighty-third street and the Hudson River, by Sweet-Orr & Co., Inc., the largest manufacturers of overalls and workmen's apparel in the world. The first leg of the novel journey, as planned by Roland Bassett, the Sweet-Orr salesman selected as the pioneer air salesman, included stops at each of the large Hudson River towns between this city and Poughkeepsie.

The idea of flying salesmen was originally evolved by Mr. Reginald Sweet of Sweet-Orr & Co., Inc., and Mr. C. Nicholas Reinhardt, general passenger agent of the Aero Limited, operated by the Travelers Company, the pioneer inaugurators of a regular daily aeroplane passenger service in this country. The first passenger line established by the Travelers Company was started three weeks ago between this city and Atlantic City, and has since proven so successful that two additional flying boats have been ordered and will be added to the service within a week. The plane to be used by the Sweet-Orr salesman is the reserve aeromarine seaplane of the Travelers Company, a thirty-foot flying boat type of 175 H. P. motor, and will be piloted by Chief Pilot Bob Hewitt.

As per schedule, Salesman Bassett made his first stop at Yonkers, where a delegation of the leading men's apparel dealers and merchants tendered him a reception and incidentally gave him the first batch of orders ever given to an aero-salesman. Leaving Yonkers, the next stop was Peekskill, after which brief stops were made at various points up the Hudson River, similar festivities having been arranged for at each of the points to be touched above Yonkers.

# Automatically Controlling the Temperature of Paper Machine Dryers

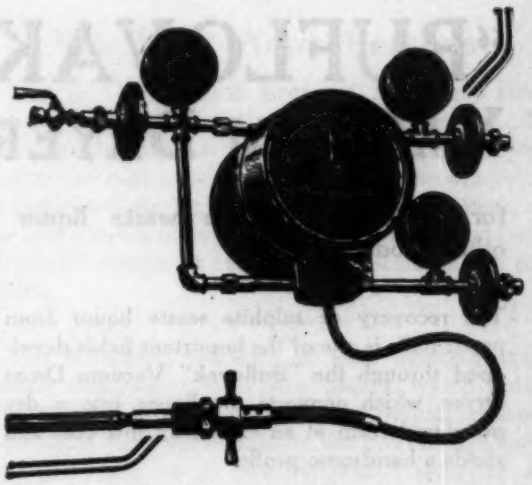
WHILE the "back tender" may be ever so conscientious and experienced, his sense of touch will not enable him to tell exactly if the temperature of the dryers is a little too high or a little too low, even if he could devote his entire time to the attempt and, as a result, the paper is not always dried uniformly.

Some of it may be thought to be fairly well dried, however, until the kicks are registered, when the stock is later worked up. But some of it is too poor to take a chance with and so it doesn't get on the reel, but is allowed to run on the floor. Then, sometimes, the drying temperature gets so far from normal that the paper won't stand the tension and breaks on the dryers, which means diminished output, loss of time and waste of steam. At such times, when no paper is running through, the so-called automatic devices heretofore used will not take care of the dryers at all and so the steam has to be shut off, and if some live steam was also on, that too goes to waste through the exhaust head. Then, when the machine is ready to start again, after having thus cooled down, not only an excessive amount of steam is required to bring the cylinders back to temperature, but more time is thus also lost.

Automatic Drying Control Systems that attempt to keep the drying cylinder temperature uniform by maintaining a steam pressure within the manifold have failed.

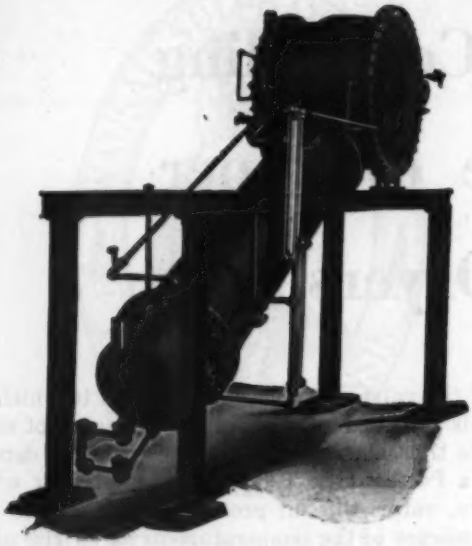
And the reason is simply this: A certain pressure in the manifold hardly ever means that the corresponding temperature is attained in the dryers. The causes that are mainly responsible for this are conduction, condensation, poor circulation and air pocketing. If such a large mass of metal as is involved did not conduct away some of the heat, if the condensation could be removed just as quickly as it forms, if there were no obstructing elbows, tees and constricted passages to retard the flow of the steam and if entrapped air could be at once gotten rid of, then devices for controlling the temperature by regulating the pressure would work very well.

What amount of air pressure is on the diaphragm-top of the valve, the consequent extent to which the valve is throttled and the resultant amount of steam that is thus allowed to enter the manifold depends upon a Perfect-type Temperature Controller which, in turn, varies this air pressure in accordance with the tendency of the temperature to fall or rise at the thermostatic-bulb with which it is provided and



which bulb projects directly into one of the drying cylinders.

When more heat is needed, first a little more steam is thus caused to enter the manifold and, if required, still more and more, until the cause for the greater amount of steam is removed and then, immediately, the valve again lets in less steam. The Controller is provided with a dial and pointer, by means of which it can be set to maintain any temperature desired. When the paper machine is engine driven and the exhaust steam is used to heat the drying cylinders, there are times when not enough of the required steam is available as exhaust. In such case, of course, the supply of exhaust steam must be augmented with live steam, and in the Witham System this is accomplished in the most economical manner.



"Buflovak" Rapid Circulation Evaporation

# "BUFLOVAK" EVAPORATORS

**and other apparatus for soda, sulphate and sulphite mills.**

Leaching Cells, Causticizers, Digesters, etc. Evaporators built to handle all liquors. Horizontal Tube Evaporators, Vertical Tube Evaporators, Rapid Circulation Evaporators, High Concentrators.

# "BUFLOVAK" VACUUM DRYERS

**for recovering sulphite waste liquor and other products.**

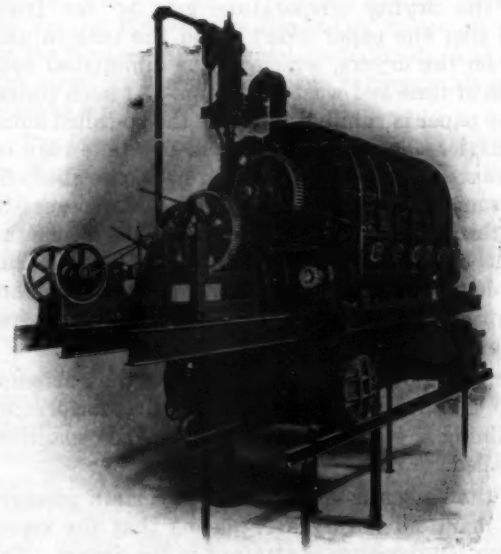
The recovery of sulphite waste liquor from paper mills is one of the important fields developed through the "Buflovak" Vacuum Drum Dryer, which converts the liquor into a dry powdered form at an extremely low cost and yields a handsome profit.

Vacuum Drum Dryers — for drying liquid solutions.

Vacuum Shelf Dryers—for materials that must be handled in pans or trays.

Vacuum Rotary Dryers — for materials that permit agitation or mixing.

Dry Vacuum Pumps, Condensers, Solvent Reclaiming and other Vacuum Apparatus.



"Buflovak" Vacuum Drum Dryer

## BUFFALO FOUNDRY & MACHINE CO.

**1599 Fillmore Avenue, Buffalo, N.Y.**

**NEW YORK OFFICE: 17 Battery Place**

While local reports say that demand for certain kinds of paper has eased off to an extent, the market as a whole continues in an active and strong position. The strike of printers and pressmen in the East has affected the movement of book and fine papers to a degree, but has failed to have mementous influence on the market at large and mills manufacturing these grades of paper are kept busy turning out their product to cover commitments. In fact, all reports from manufacturing centers agree that mills are operating at maximum capacity and are little bothered by developments arising from time to time in different localities of the country. The great majority of plants are booked far ahead in orders and are shipping out their full production as rapidly as it becomes available. That this situation will continue for at least the balance of the year seems assured in view of the sold-up condition of mills.

In keeping with the situation in many other commodities, prices on the various grades of paper have undergone little advancement during the past several weeks. There have been exceptions, of course—news print, for example—but the level of values at present is very nearly the same as that of a month ago. If anything, there is a slightly softer tendency to quotations on some kinds of paper. This may be attributed mainly to an easing off of raw material prices, which, while not of important scope, has been broad enough to check the upward march of prices on the finished product. Labor is the one great problem the paper manufacturer has to contend with at present. There is no cheapening of production costs on this score, and it can be said that very few mills have all the hands working that they could well utilize.

The export market continues to hold forth promising possibilities, but the average paper manufacturer in this country is unable to take advantage of opportunities in this direction because he has little or none of his product to divert to foreign lands. South American buyers are reported to be becoming discouraged in their efforts to secure paper in the United States and are looking to Canada, England and Scandinavia for supplies. There are nevertheless some American mills which are building up a substantial export business and all indications point to their holding for an indefinite time the larger percentage of the foreign customers they have acquired in recent months and are still acquiring.

As emphasizing the pinched condition of available supplies of news print, one leading import and export firm in New York has imported quite a quantity of news print from Sweden to dispose of in the United States. This Swedish paper is priced at slightly beyond ruling quotations on domestic news print, but indications are that unless demand lets up very soon, publishers may be obliged to meet the extra cost in covering their requirements, as the consumption of news print is steadily increasing and domestic manufacturers are working under pressure to fill commitments.

Fine papers are moving in consistent volume and at firm prices. Wrappings and other coarse papers meet a ready market and prices are steady. There is not the snap to the demand for book papers there was a short while back, but mills are sold well ahead and are running full. Boards are active and quotably strong.

## New York News Personals

Vito G. Cantasano & Bros., of 185 South street, has purchased the building at 5-7-9 James slip. The increased business which the company has enjoyed during the past year has necessitated the acquisition of additional facilities for the handling of rags, and the new plant will be given over to sorting and baling of special grades of rags when alterations are completed.

---

Ten thousand members of local printing trades unions employed in 250 local plants, which publish virtually all the trade journals and magazines issued here and a large percentage of the books, were forced out of work by a simultaneous "lockout" and "strike." This action follows the refusal of the employers to grant a forty-four hour week, effective today, and a weekly increase of $14 in all wage scales.

The men affected by the "lockout" announced that they were on strike. The employers issued orders that their plants were to remain closed until such time as they can be reopened with forces composed exclusively of members of the international union.

Under an agreement between the employing printers and the international union, the forty-four-hour week is to become effective May 1, 1921. Local unions insisted that it become effective today, and they refused to arbitrate this point, although they agreed to submit their wage demands to arbitration. The employers, who have offered to arbitrate both the questions of hours and wages, offered a wage

(*Continued on page 563*)

*HIGH GRADE*

*Paper Manufacturers' Supplies*

*Chemical and Mechanical Wood Pulp*

IMPORT EXPORT

RAGS—PAPERSTOCK
ROPE—BAGGING
STRINGS

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ALFRED J. MORAN, Manager

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*Established 1885* *LONG DISTANCE PHONES Harrison 5557-2840*

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¶ Our Daily Capacity is 300,000 pounds.

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KALAMAZOO MICHIGAN

## Papermaking Rags

The uninterrupted flow of foreign rags into this country continues to act as a detriment to the market for domestic papermaking rags and prices have undergone further softening. Consuming mills evidently are obtaining imported rags at lower prices than domestic material because signs are not wanting that they are giving preference to the former, and with importations surprisingly heavy, domestic rags are afforded a comparatively narrow outlet. There has been no sharp reaction in values, but the general trend of quotations has been downward and sales have been repeatedly recorded establishing prices on reduced levels. Dealers express confidence that it is only a matter of a short time when imports will diminish and that then domestic rags will come in for their share of activity, but against their arguments are numerous reports concerning large stocks mills have accumulated. Roofing rags have declined approximately $5 per ton within the month.

| | |
|---|---|
| New Stock— | |
| White shirt cuttings, No. 1 | 14.50-15.00 |
| White shirt cuttings, No. 2 | 9.00- 9.25 |
| Fancy shirt cuttings | 11.00-11.25 |
| Washables, No. 1 | 9.00- 9.25 |
| Unbleached muslins | 12.50-13.00 |
| White lawns | 13.50-14.00 |
| Overall cuttings, blue | 11.00-11.25 |
| Black silesias | 7.00- 7.25 |
| Old Stock— | |
| Whites, No. 1 repacked | 7.25- 7.50 |
| Whites, No. 2 repacked | 5.50- 5.75 |
| Whites, house soiled | 4.00- 4.25 |
| Whites, street soiled | 3.25- 3.50 |
| Thirds and blues, repacked | 4.00- 4.25 |
| Thirds and blues, rough | 3.50- 3.65 |
| Black stockings | 3.60- 3.80 |
| Lace curtains | 7.00- 7.25 |
| Cotton canvas, No. 1 | 5.00- 5.25 |
| White cotton batting | 5.25- 5.50 |
| Roofing, No. 1 | 2.60- 2.70 |
| Roofing, No. 2 | 2.50- 2.60 |

## Rope and Bagging

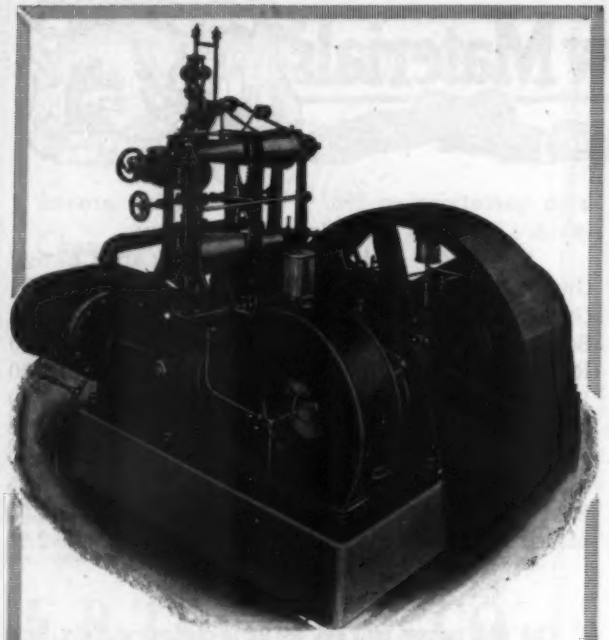
Viewing the month as a whole, a fairly good business has been done in old rope, but demand has eased off within the past few days and prices have declined slightly. No. 1 Manila rope is quotable at 6 to 6.25 cents per pound f. o. b. shipping point and consumers as a rule are neglecting offerings at above the lower figure. Bagging is quiet and easy in price, with quotations on No. 1 scrap ranging around 3 cents. Prices f. o. b. New York follow:

| | New York and Chicago |
|---|---|
| Gunny, No. 1 domestic | 3.50-3.75 |
| Gunny, No. 1 foreign | 3.50-3.75 |
| Scrap bagging, No. 1 | 2.90-3.10 |
| Roofing bagging | 2.40-2.50 |
| Wool tares, heavy | 3.75-4.00 |
| Wool tares, light | 3.50-3.75 |
| Manila rope, No. 1 foreign | 6.00-6.25 |
| Manila rope, No. 1 domestic | 6.00-6.25 |
| Sisal strings | 3.25-3.50 |
| Mixed strings | 2.50-2.60 |

## Old Papers

The old paper market is in a comparatively firm position although there are weak spots in the list of grades. The principal buying at present is being done by board mills, with the result that low qualities of stock display a relatively firmer undertone than the high grades. Book paper manufacturers retired from the eastern market several weeks ago almost in a body and since then prices on flat stock have gone steadily downward. Kraft paper also has declined, while on the other hand, mixed paper and the several descriptions of news hold quotably firm at about previous levels. The strike of printers in New York has served to materially diminish the production of waste paper in this center, but the effect on the market has been slight because the decreased demand from mills for those grades chiefly affected by the printing industry tie-up has acted to offset the smaller supplies available. As matters shape up, consuming mills are absorbing the bulk of old paper offered.

| | New York and Chicago |
|---|---|
| Hard white shavings, No. 1 | 5.25-5.50 |
| Hard white shavings, No. 2-3 | 4.50-4.75 |
| Soft white shavings | 4.00-4.25 |
| Colored shavings | 1.60-1.80 |
| Heavy book, No. 1 | 2.00-2.25 |
| Crumpled, No. 1 | 1.70-1.80 |
| Ledger stock | 2.60-2.80 |
| Kraft, No. 1 | 3.25-3.50 |
| Manilas, No. 1 | 1.40-1.50 |
| White blank news | 1.80-1.90 |
| Overissue news, No. 1 | 1.25-1.35 |
| Folded news | .95-1.00 |
| Mill wrappers | 1.00-1.10 |
| Box board cuttings | .90- .95 |
| Mixed paper, No. 1 | .85- .90 |
| Common paper | .65- .70 |



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The secret of durability is found in the special composition metal that is used in the make-up of the wire, and by reason of its substantial construction a long life with a large tonnage is assured.

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Prices and samples will be mailed upon request.

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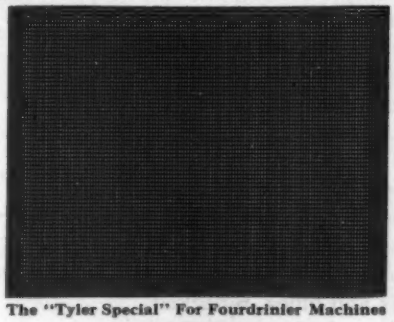
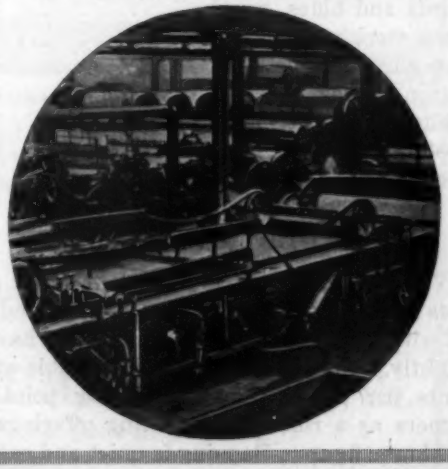


The "Tyler Special" For Fourdrinier Machines



(Continued from page 559)

increase of $6 a week, which was rejected by the men.

Charles Drury Jacobs has resigned his connections with the local sales staff of the American Writing Paper Company to become affiliated with the American Paper Mills Corporation, of 38 Park Row, of which he has been elected vice president.

President Philip T. Dodge of the International Paper Company sailed from New York a few days ago to spend several months in Europe on business.

Frederick Enders, vice president of the Wood Pulp Trading Company, 501 Fifth avenue, recently returned from a two-months' trip to the Scandinavian countries where he made a detail study of conditions prevailing in the wood pulp industry. Mr. Enders states that pulp mills in Norway and Sweden are operating at only about 50 per cent of capacity, and that his observations lead him to believe there will be no reduction in foreign pulp prices for some time to come.

Emory G. Bullis has resigned as manager of the Philadelphia office of the Seaman Paper Company, of Chicago and New York, to become vice president and sales manager of the Preston Trading Company, of 33 West Forty-second street, New York.

Harold Hughes, South American representative of the Pulp and Paper Trading Company, 21 East Fortieth street, has departed for an extended tour of Brazil, Argentina, Chile and Uruguay in the interests of his firm.

Plans are being completed for the fall conference of the members of the American Paper and Pulp Association to be held at the Waldorf-Astoria Hotel in this city on November 10-13, inclusive. Various problems confronting the industry will be delved into and considered at length, and Secretary L. B. Steward says that present indications point to a large attendance.

Hamilton and Hansell, Inc., exporters and importers of paper and wood pulp of 15 Park Row, have changed their name to the American Transmarine Company, Inc. No change in the policy or personnel of the concern is contemplated.

The Main Paper Stock Company, extensive packers of paper mill supplies of all descriptions of 25-31 Peck Slip, New York, has opened a branch office at Room 308 Neave Building, Cincinnati, O., with J. A. Brockman in charge. The company also maintains branches in Boston and Holyoke.

The General Paper Products Company is reported about to break ground for a large plant at Lockland, Ohio.

## National Safety Council Congress

The sessions of the Paper and Pulp Section were particularly well attended, and the interest was sustained up to the end of the last session.

Friday's session found the accommodation provided by the officials much too small and an overflow audience had to be content with chairs in the passage outside the meeting room.

Papers were contributed by Messrs.: G. W. Dickson, Riordon Pulp & Paper Co., Ltd., Hawkesbury; Erling Riis, Wausau Sulphate Fibre Co., Mosinee, Wis.; Robert Altman, Marathon Paper Mills Co., Rothschild, Wis.; H. H. Matthieson, Crown Willamette Paper Co., Portland, Oregon; S. F. Shattuck, Kimberley-Clark Company, Neenah, Wis.; Al. Kroes, Employers and Mutual Liability Insurance Co., Wausau, Wis.

Mr. Al. Kroes was particularly successful in his poster talk and presented to the meeting his methods of getting close to employees in a humorous, vigorous, effective way. The meeting was sorry indeed when the discussion of this paper came to a close, and showed its feeling in a practical way by unanimously passing a standing vote of thanks and appreciation to Mr. Al. Kroes for his address.

Mr. Robert Altman, Marathon Paper Mills Co., Rothschild, was elected Chairman of the Paper and Pulp Section in succession to Mr. A. P. Costigane, who was anxious to be relieved of the duties.

Mr. G. W. Dickson, Riordan Pulp & Paper Co., Ltd., Hawkesbury, was elected Vice-Chairman.

## Downing Box Co. Expands

Plans are being prepared for a large addition to the Downing Paper Box Company, Third street and Vienna avenue. According to officials of the company, the addition is to cost approximately $40,000. It will be a one story structure, 120-300 feet. Work is to be commenced immediately. The Downing company, organized a year ago, started operations about six months ago. It is in the heart of the North Side's new manufacturing district.

Plans for the proposed new paper mill of the Brockville Manufacturing Company, Ltd., of Brockville, Ontario, which was recently organized for the purpose of manufacturing book, catalogue and bond papers, are being prepared by M. C. Billingham, the prominent paper mill engineer of Kalamazoo, Mich., and it is expected that construction will be well under way by spring.

The Interlake Tissue Mills, of Merritton, which were built in 1912, will more than double their capacity. The contract has been let for a second machine, a Harper Fourdrinier, 148 inches wide, which will be the widest tissue machine in America.

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**BAGGING** **ROPE**

## New Papers

| | |
|---|---|
| Writing— | |
| White rag | 20-40 |
| White sulphite, No. 1 | 12-20 |
| Colored | 14-23 |
| Ledger— | |
| White rag | 20-42 |
| White sulphite | 14-22 |
| Colored sulphite | 16- |
| Colored rag | 22- |
| Bonds— | |
| White rag | 17-47 |
| White sulphite | 13-22 |
| Colored sulphite | 14-26 |
| Colored rag | 17-50 |
| Book— | |
| No. 1 S. & S. C | 9.00- 9.50 |
| Machine finished | 8.50- 9.00 |
| English finished | 9.00-12.00 |
| Coated and enamel | 10.50-14.00 |
| Lithograph, M. F | 8.75-12.00 |
| News Print— | |
| Rolls, contract | 3.75- |
| Rolls, transient | 5.00- 5.50 |
| Sheets | 5.00- 5.25 |
| Side runs | 4.25- 4.50 |
| Cover Stock— | |
| Coated, both sides | 12.25- |
| Coated, one side | 12.20- |
| Wrappings— | |
| No. 1 kraft | 8.50- 9.00 |
| No. 2 kraft | 7.75- 8.25 |

| Boards— | New York | Chicago |
|---|---|---|
| Solid news | -65.00 | 55.00-60.00 |
| Straw | 55.00-60.00 | 40.00-45.00 |
| Plain chip | -60.00 | 50.00-55.00 |
| White coated chip | 75.00-80.00 | 65.00-70.00 |
| Manila coated chip | 70.00-75.00 | 65.00-70.00 |
| Binders board | 75.00-80.00 | 75.00-80.00 |

## Mechanical Pulp

Under the stimulus of an active and voluminous demand from news print manufacturers and other consumers, quotations on mechanically ground wood pulp have continued to rise during the past month, thus confirming predictions made by many traders some time ago that ground wood would sell at high levels in the fall. All-spruce ground wood of prime quality has realized as much as $4 per ton f. o. b. producing plants, and the majority of manufacturers now decline to entertain offers very much under this figure for spot shipments. Wood supplies are on the increase and grinders have experienced less difficulty from water shortage this season than normally, but the consumption of mechanical pulp has broadened to such an extent as a result of the heavy demand for news print as well as for other kinds of paper that the production is not large enough to cover the requirements of consumers. Current quotations range from $35 to $40 per ton, with most sellers naming the high figure.

## Chemical Pulp

Business of fairly large volume has been done in chemical wood pulp during the past month, and the market still exhibits a firm undertone, although demand from consuming sources is not characterized by the snap that was such an outstanding market feature a short time ago. Paper manufacturers in quite a number of cases appear to have at least partially covered requirements through recent purchases and have let up in their buying, yet virtually all the pulp being offered is finding takers ready to absorb it, while most producers are sold up to the extent where they have little supply to divert to the open market. Sulphite of all qualities is firmly quoted. Unbleached of news print grade is selling at 3.50 to 3.75 cents, spot lots easily commanding the latter figure, and mills which ordinarily are sellers are frequently coming into the market to buy pulp to fill their own needs. Bleached sulphite of standard quality is priced at 6 cents upward a pound and offerings are light, leading manufacturers being sold ahead for several months. Kraft is quotably firm and is moving in consistent volume, board mills being among the most active buyers. Quotations f. o. b. pulp mills are:

| | |
|---|---|
| Bleached sulphite | 6.00-6.50 |
| Easy bleaching sulphite | 4.50-5.00 |
| News grade sulphite | 3.50-3.75 |
| Soda pulp, bleached | 4.75-5.00 |
| Mitscherlich unbleached | 5.50-5.75 |
| Kraft, No. 1 | 4.25-4.75 |
| Screenings, refined | 1.75-2.00 |

## Chemicals

Papermaking chemicals are generally moving into consuming channels in a steady way and in good volume. Not only are domestic users buying regularly but export business shows consistent growth,

F. G. MARQUARDT, President
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A. D. LORENZ, Treasurer

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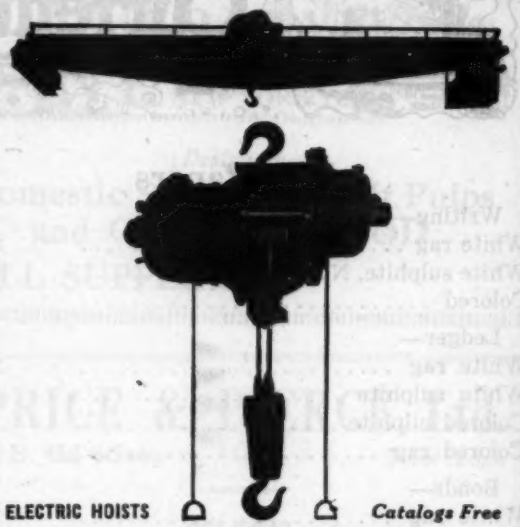

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*Offices located all over the World*

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| Stockholm | Teneriffe |
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| Genoa | Hong-Kong |
| San Francisco | Shanghai |
| Las Palmas | Tientsin |
| Calcutta | Batavia |
| Samarang | Durban |
| Surabaya | Cape Town |
| | Valparaiso |

NEW YORK 17 BATTERY PL. U.S.A.

N.O.C. N.O.C.

under which conditions prices hold firm. Prices follow:

| | |
|---|---|
| Alum, lump ammonia | 4.25- 4.50 |
| Alum, lump starch | 9.00- 9.50 |
| Alum, powdered | 4.50- 5.00 |
| Blanc fixe | 4.25- 4.50 |
| Bleaching powder (domestic drums) | 2.25- 2.50 |
| Brimstone (ton) | 18.00-20.00 |
| Casein | 14.00-16.00 |
| Caustic soda | 3.00- 3.25 |
| China clay, domestic, washed | 11.00-13.00 |
| China clay, foreign | 15.00-20.00 |
| Rosin, grade E | 18.50- |
| Satin white | 2.25- 2.50 |
| Soda ash, 58 per cent light (bags) | 1.90- 2.00 |
| Sulphite of alumina, commercial grade | 1.80- 2.00 |
| Starch, Globe, in bags | 5.87- |
| Talc (ton) | 12.00-15.00 |

## Foreign Trade Opportunities

An import corporation in Switzerland desires to secure a general agency for the sale of raw materials for the manufacture of blotting, typewriter and linen paper. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 30740.

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The representative of a firm in Italy who is in the United States for a short time desires to secure agencies for the sale in Italy of paper and stationery. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 30749.

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A firm in France desires to secure the representation of firms for the sale of paper and all articles in connection with the printing industry. Correspondence should be in French. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 30757.

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A commission merchant in Peru desires to receive catalogues of paper. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 30739.

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A firm in China desires to purchase and secure an agency for the sale of stationery, news print paper and old newspapers. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 30583.

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A manufacturers' agent in Colombia wishes to secure direct representation of manufacturers of paper products. Correspondence may be in English. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 30601.

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An agency is desired by a man in Switzerland for the sale of materials for paper making. Quotations should be given f. o. b. New York. Correspondence may be in English. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 30607.

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An agency is desired by a man in England for the sale of cotton-mill supplies, including brown paper. Quotations should be given c. i. f. English port. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 30833.

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A merchant in France desires to secure an agency on a commission basis for the sale of paper and paper supplies (boxes, wrapping paper, etc.). Samples and price lists are requested. Correspondence should be in French. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 30848.

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A firm in Egypt desires to secure agencies for the sale of paper. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 30828.

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## New York News Personals

The New York paper mill supply trade lost one of its best known and most beloved members in the death of Daniel M. Hicks, president and senior member of the firm of Daniel M. Hicks, Inc., papermakers' supply merchants of 140 Nassau street, who died at his home on Halsey street, Brooklyn, on September 23, following an illness of about six weeks of pneumonia and a complication of other ailments. Mr. Hicks was sixty years old and was a veteran of the local trade, having been prominently identified with the paper stock industry for upwards of twenty-five years. He obtained his start in the mill supply business as a bookkeeper for the firm of R. H. Overton & Son, the younger member of which concern was Frank Overton, now of Castle, Gottheil & Overton. In 1895 he established his own company, and in subsequent years became widely known among paper manufacturers throughout the country. Mr. Hicks leaves three sons, who were connected with their father in business and who will continue the business, a widow and three daughters.

**The Pulp and Paper Trading Co.**

21 East 40th Street New York City

Dealers in Domestic Chemical and Mechanical Pulps and Paper

AGENTS FOR

J. & J. Rogers Company, Au Sable Forks, N. Y.
Canadian Kraft, Ltd.
Dealers in Wayagamack Kraft
Three Rivers, Canada

EASTERN AGENTS FOR

Port Huron, Michigan, Mitscherlich Sulphite
Made by Port Huron Sulphite & Paper Co., Port Huron, Mich.

**AMERICAN TRANSMARINE CO., INC.**

13 PARK ROW

Formerly HAMILTON & HANSELL, INC.

Exporters and Importers

PAPER and WOOD PULP

RYDÖ STRONG SWEDISH UNBLEACHED SULPHITE IN STOCK

**E. J. KELLER COMPANY**

INCORPORATED

200 FIFTH AVENUE

NEW YORK

FOREIGN AND DOMESTIC

PAPER MAKERS' SUPPLIES
COTTON, JUTE AND FLAX WASTES
COTTON BAGGING MATERIALS
EAST INDIA MERCHANDISE

***Hart Trading Co. Inc.***

*Tribune Building, New York*

PAPER MILL AGENTS

EXPORTERS and IMPORTERS

PAPER PULP

*BRANCH OFFICES*

*Chicago Rio de Janeiro Buenos Aires Valparaiso*

**The Stickle Automatic Steam Control for Paper Machines**

WE wish to emphasize the word "automatic." This with us means that the steam follows changes that come to the sheet from free to hard drying stock or any ordinary changes in weights. A control that does not do this in itself is not automatic. This makes a better sheet of paper. We guarantee to hold the moisture at any point you wish with ½ of 1% change. Furnished on 60 days' approval.

**OPEN COIL HEATER & PURIFIER CO.**

INDIANAPOLIS, IND.

BOSTON PHILADELPHIA

**REX Paper Company**

*Manufacturers of*

*Coated and OFFSET*

Papers

Kalamazoo, Michigan

## Chemical Pulp

Continued high cost of production, coupled with increased buying by British, Japanese and other consumers, are held accountable for the rise in pulp prices in Scandinavia, where supplies are reported to be rapidly reaching a stage of depletion. Local importers have been hoping that as the time when navigation over the Baltic is closed for the winter draws near, offerings of sulphite by Swedish manufacturers would increase, but thus far there have been no concrete signs of this, pulp producers on the other side of the Atlantic displaying a rather indifferent attitude toward buyers in the United States. Arrivals during the past month at the port of New York have continued light and practically all the supply received has been pulp bought for shipment here. Dock stocks are at a minimum and very few spot lots are being offered. Prices are firm and high with no indications of their going lower for some time to come. Receipts within the past month and current quotations are:

| | |
|---|---|
| Bleached sulphite | $7.50-8.00 |
| Unbleached sulphite, No. 1 | 5.00-5.25 |
| Easy bleaching | 5.50-5.75 |
| Mitscherlich unbleached | 5.75-6.00 |
| Kraft | 4.50-4.75 |

New York Oversea Company, 1,306 bls. from Christiania, 2,400 bls. from Gothenburg.

M. Gottesman & Co., 1,056 bls. from Christiania.

E. M. Sergeant & Co., 1,600 bls. from Christiania, 350 bls. from Copenhagen.

J. Anderson & Co., 1,950 bls. from Christiania.

Edwin Butterworth & Co., 200 bls. from Christiania.

American Woodpulp Corp., 4,125 bls. from Gothenburg.

A. J. Pagel & Co., 1,200 bls. from Gothenburg.

Tidewater Paper Mills, 7,243 bls. ground wood from Liverpool, N. S.

Order, 1,250 bls. from Christiania.

## Paper Stock

In point of volume, importations of papermaking material have probably broken all previous records for the same length of time during the past month. Rags from Holland, England, France and other European countries, Germany included, have arrived in surprisingly large quantities, while shipments of old rope and bagging have been relatively as heavy. In fact, so many rags have come in that stocks are beginning to pile up on the docks in New York and other Atlantic ports, and the probabilities are that unless the influx recedes very soon the market here will be glutted. Arrivals within the month follow:

F. W. Bird & Son, 1,006 bls. from Rotterdam.

Patent Vulcanite Roofing Co., 450 bls. from Rotterdam.

Jebb Bros. 382 bls. from Rotterdam, 49 bls. from Hull.

National City Bank, 477 bls. from Rotterdam, 202 bls. from Bordeaux, 12 bls. from Hull.

Brown Bros. & Co., 705 bls. from Rotterdam, 295 bls. from Hull, 510 bls. from Antwerp.

Castle, Gottheil & Overton, 1,076 bls. from Rotterdam, 434 bls. from Hull, 11 bls. from Antwerp, 38 bls. from London.

Irving National Bank, 323 bls. from Rotterdam, 708 bls. from Antwerp, 59 bls. from Glasgow, 54 bls. from Leith.

Irving Trust Co., 86 bls. from Rotterdam.

Bank of New York, 308 bls. from Rotterdam.

Foreign Trade Banking Corp., 478 bls. from Rotterdam, 59 bls. from Glasgow, 105 bls. from Hull.

R. F. Downing & Co., 1,026 bls. from Rotterdam, 153 bls. from London.

Salomon Bros. & Co., 517 bls. from Rotterdam, 170 bls. from Hull.

Certain-Teed Products Corp., 285 bls. from Bordeaux, 737 bls. from Hull, 580 bls. from Antwerp.

Equitable Trust Co., 863 bls. from Bordeaux, 1,145 bls. from Hull, 78 bls. from Antwerp, 46 bls. from Leith.

A. Salomon, Inc., 218 bls. from Bordeaux, 157 bls. from Hull.

W. Hughes & Co., 180 bls. from Liverpool.

Schulz & Ruckgaber, 267 bls. from Manchester.

Kidder, Peabody & Co., 390 bls. from Hull, 71 bls. from Bordeaux.

Wilkinson Bros. & Co., 92 bls. from Hull, 448 bls. from Rotterdam.

British Bank of South America, 68 bls. from Manchester.

Battery Park National Bank, 342 bls. from Rotterdam.

Edwin Butterworth & Co., 280 bls. from Antwerp, 363 bls. from Rotterdam.

American Express Co., 163 bls. from Bordeaux.

Albion Trading Co., 149 bls. from London.

Frank & Berg, 761 bls. from Rotterdam.

Maurice O'Meara Co., 600 bls. from Rotterdam.

R. Goldstein & Sons, 411 bls. from Rotterdam.

Atterbury Bros., 560 bls. from Rotterdam, 287 bls. from Hull.

Sanderson & Son, 154 bls. from Hull.

Order, 1,394 bls. from Rotterdam, 1,324 bls. from Bordeaux, 110 bls. from Antwerp.

# BERMINGHAM & PROSSER CO.

— Kalamazoo, Michigan —

*PAPER Distributors*

*Let us submit an estimate on your next*

Catalog
Booklet
Broadside
*or* Magazine

MAKE THE HANDLING OF

# *Parchment* Profitable to You

¶We have prepared Samples, put up in neat cartons, for the Jobbing Trade.

¶If you have not received a set we will gladly send one.

ALSO
*Special Price Lists*
FOR YOUR SALESMEN

## SUTHERLAND PAPER CO.

*Makers of*
Pure Vegetable Parchment
KALAMAZOO MICHIGAN

*The Symbol of Quality*

*The Symbol of Quality*

# LAKESIDE PAPER COMPANY

NEENAH, WISCONSIN

*"Our name stands for Quality"*

***We are manufacturers of Bonds, Bible, Book, Catalogue, Eggshell, English Finish Opacity, M. F. and S. & S. C. French, Myriad Manifold, Tiffany Bond, Glazed, Unglazed, and Embossed, Gaza Onionskin, R. R. Writing, Writing Manila, High Cliff Mimeograph, White and Colored Laid Flats. Also other light and heavy weight M. F. and S. & S. C. specialties.***

Quality and Service

*From a Jobber:*

***"We are enclosing an order for two additional cars and think it would be well to add that your paper has been running very satisfactory and that it will probably be some little satisfaction to you to know that we are thoroughly satisfied with this sheet and think it well to give you a word of praise."***

THE PRODUCTS OF INDIVIDUALITY

## Old Rope

Brown Bros. & Co., 165 coils from Bristol, 642 coils from Hull, 50 bls. from Havre.
Old Colony Trust Co., 540 coils from Bristol.
Schulz & Ruckgaber, 121 coils from Liverpool.
Maurice O'Meara Co., 12 bls. from Manchester.
Irving National Bank, 143 coils from Leith.
Castle, Gottheil & Overton, 464 bls. from London.
International Purchasing Co., 237 coils from Hull.
W. Schall & Co., 464 coils from Hull.
R. F. Downing & Co., 222 pkgs. from Rotterdam.
National City Bank, 119 coils from Liverpool.
United Fruit Co., 14 bls. from Cristobal.
Order, 90 coils from Antwerp.

## Old Bagging

R. Goldstein & Sons, 535 bls. from Rotterdam.
Wilkinson Bros. & Co., 112 bls. from Glasgow, 128 bls. from Manchester.
Northern Metal Co., 316 bls. from Rotterdam.
Maurice O'Meara Co., 111 bls. from Glasgow, 153 bls. from Manchester.
Schulz & Ruckgaber, 61 bls. from Liverpool, 389 bls. from Manchester.
Mechanics & Metals National Bank, 119 bls. from Manchester.
National City Bank, 426 bls. from Manchester, 50 bls. from Antwerp, 56 bls. from Hull.
J. Oppenheimer, 23 bls. from Hull.
Maurice O'Meara Co., 41 bls. from Glasgow, 75 bls. from Manchester.
I. H. Franks, 53 bls. from London.
Castle, Gottheil & Overton, 109 bls. from London.
Battery Park National Bank, 501 bls. from Rotterdam.
Salomon Bros. & Co., 83 bls. from Glasgow, 37 bls. from Bristol.
British Bank of South America, 60 bls. from Manchester.
Order, 341 bls. from Antwerp, 116 bls. from Hull.

## Miscellaneous Paper Stock

National Bank of Cleveland, 406 bls. from Rotterdam.
Daniel M. Hicks, Inc., 38 bls. from Manchester.
Wilkinson Bros. & Co., 58 bls. from Manchester, 492 bls. from Rotterdam.
Equitable Trust Co., 125 bls. from Manchester, 368 bls. from Hull.
International Corp., Ltd., 66 bls. from Manchester.
Castle, Gottheil & Overton, 77 bls. from Manchester, 168 bls. from Antwerp.
National City Bank, 273 bls. from Glasgow, 188 bls. from Antwerp.
W. Hughes & Co., 157 bls. from Glasgow.
Kidder, Peabody & Co., 292 bls. from Antwerp.
W. Schall & Co., 168 bls. from Antwerp.
Goldman, Sachs & Co., 376 bls. from Hull.
Guaranty Trust Co., 48 bls. from Glasgow, 69 bls. from Manchester, 335 bls. from Rotterdam.
R. F. Downing & Co., 103 bls. from Manchester.
E. J. Keller Co., 124 bls. from Rotterdam.
Order, 268 bls. from Glasgow.

## Paper

Cigarette paper from France constitutes the bulk of paper coming into the United States at the present time from foreign sources. Occasional shipments of hanging, filter, tissue and other kinds of paper also are being received but current importations are considerably below the pre-war normal in volume. Arrivals at the port of New York during the past month follow:

## Cigarette

Equitable Trust Co., 1,106 cs.
American Tobacco Co., 625 cs.
A. J. Woodruff & Co., 1 cse.
C. Drucklieb, 27 cs.
Wilkinson Bros. & Co., 3 cs.
L. Kehlmann & Co., 6 cs.
Liggett & Meyers Tobacco Co., 84 cs.
B. E. Teale, 50 cs.

## Hanging

Prager & Co., 662 cs.
F. L. Kraemer & Co., 9 pkgs.
W. H. S. Lloyd & Co., 16 bls.

## Filter

Lunham & Moore, 18 cs.
J. Manheimer, 43 cs.
J. Melloy, 15 cs.
American Express Co., 3 cs.

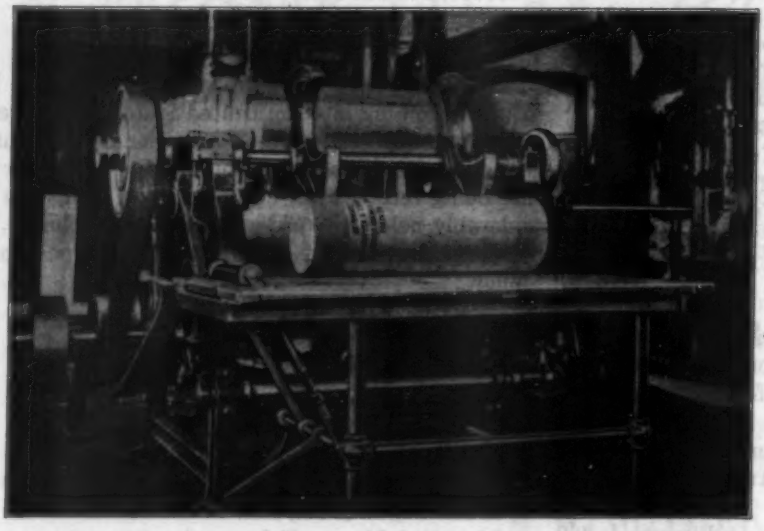
## Tissue

W. Schall & Co., 4 pkgs.
Robert Hoe & Co., 4 bls.

## Miscellaneous

F. L. Kraemer & Co., 3 bls.
American Trading Co., 9 cs.
A. C. Dodman, 15 bls.
B. F. Drakenfeld & Co., 30 cs.
Lunham & Moore, 11 cs.
Interstate Pulp & Paper Co., 4,225 rolls.
Tice & Lynch, 2 cs.
H. C. Davison & Co., 10 cs.
J. P. Roosa, 3 cs.
J. J. Gavin & Co., 2 cs.
C. A. Johnson & Co., 13 bls.
E. G. Enter, 55 bls.
J. H. & G. B. Siebold, 20 cs.
Black, Starr & Frost, 14 cs.
G. E. Stechert & Co., 10 bls.
Worthington & Raymond, 2 cs.

# EFFICIENCY IN WRAPPING ROLLS



*is only obtainable by the use of the*

*Power Roll Wrapper*

Wraps and stencils Rolls at a saving of from fifty to seventy-five per cent.

**Nekoosa Motor & Machine Company**

*Manufacturers and Sole Agents*

**NEKOOSA, WIS., U.S.A.**

**WHEN** you buy a water heater, or anything else for that matter, you do not actually buy a water heater, but what it will do.

**"SIMS"** Open Feed Water Heater, Filter and Purifier is the product of Modern Engineering Science and has met the demand for greater efficiency.

**OPEN FEED** construction is the most simple and effective principle of feed water heating and has less maintenance troubles and operating costs than any other type.

**WATER HEATER** feeds your boilers with hot water, reduces the strain from contraction and expansion due to feeding cold water and effects a saving of approximately 14.5% in fuel.

**FILTER** the feed water in a filtering chamber containing hard coke of suitable size as the filtering medium.

**and PURIFIER** Water containing earthy matter and carbonate of lime when heated close to the boiling point is thrown out of solution into suspension and is removed by the filter.

**Is installed you GET the service you bought**

***Ask us about the "Sims" feed-water heaters.***

# THE SIMS COMPANY

***"We Keep Others in Hot Water."***

**ERIE** **PENNA.**

**The "SIMS" Open Feed WATER HEATER, FILTER & PURIFIER**

# Buyers' Guide—What and Where to Buy

## Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

**MECHANICAL PULP (Processes)**
Hall, Ward & Walker, Inc., Watertown, N. Y.

**KNIVES**
John W. Bolton & Sons, Inc., Lawrence, Mass.
R. J. Dowd Knife Works, Beloit, Wis.
Simonds Manufacturing Co., Fitchburg, Mass.

**LAYBOYS**
Moore and White Co., Philadelphia, Pa.

**LIFTS**
Economy Engineering Co., Chicago, Ill.

**LINE SHAFT BEARINGS**
The Hill Clutch Co., Cleveland, Ohio.

**MACHINE DRYER TEMP. CONTROL**
Open Coil Heater and Purifier Co., Indianapolis, Ind.
Valley Iron Works, Appleton, Wis.

**MECHANICAL PULP**
J. Andersen & Co., 21 E. 40th St., New York City.
Hart Trading Co., Inc., Tribune Bldg., New York City.
E. B. Thomas & Co., Inc., 100 Hudson St., New York City.

**PAPER BOARDS**
The C. L. La Boiteaux Co., 200 Fifth Ave., N. Y.
F. D. Wilson, 1530 Lumber Exchange Building, Chicago, Ill.

**PAPER DISTRIBUTORS**
Bermingham and Prosser, Chicago, Ill.
Seaman Paper Co., Chicago, Ill.

**PAPER EXPORTERS AND IMPORTERS**
American Transmarine Co., 13 Park Row, New York City.
Gatti-McQuade Co., 200 Fifth Ave., New York City.
Hart Trading Co., Inc., Tribune Bldg., New York City.
E. J. Keller Company, 200 Fifth Ave., N. Y. C.
Main Paper Stock Co., 23-31 Peck Slip, New York City.
New York Overseas Co., 17 Battery Place, New York City.
Storm & Bull, 2 Rector St., New York City.
E. B. Thomas & Co., Inc., 100 Hudson St., New York City.

**PAPER MACHINES**
Beloit Iron Works, Beloit, Wis.

**PAPER MANUFACTURERS**
Bardeen Paper Co., Otsego, Mich.
Bryant Paper Co., Kalamazoo, Mich.
Lakeside Paper Co., Neenah, Wis.
Monarch Paper Co., Kalamazoo, Mich.
Munising Paper Co., Munising, Mich.
Northern Paper Mills, Green Bay, Wis.
Rex Paper Co., Kalamazoo, Mich.
Ticonderoga Pulp & Paper Co., 200 Fifth Ave., New York City.
Watervliet Paper Co., Watervliet, Mich.
Wausau Sulphate Fibre Co., Mosinee, Wis.
Wolverine Paper Co., Otsego, Mich.

**PAPER MANUFACTURERS' SUPPLIES**
J. Andersen & Co., 21 East 40th St., New York City.
Robert Blank, 140 Nassau St., New York City.
Francis Hughes Co., 21st St. and Loomis Ave., Chicago.
E. J. Keller Company, 200 Fifth Ave., N. Y. C.
Gatti-McQuade Co., 200 Rifth Ave., New York City.
Martin Spinelli, 132 Nassau St., New York City.
Main Paper Stock Co., 23-31 Peck Slip, New York City.
Mendelson Bros. Paper Stock Co., 910 Michigan Ave., Chicago.
New York Overseas Co., Inc., 17 Battery Place, New York City.
E. B. Thomas & Co., Inc., 100 Hudson St., New York City.

**PAPER TESTERS**
B. F. Perkins and Son, Inc., Holyoke, Mass.
The Widney Co., Chicago, Ill.

**PARCHMENT MANUFACTURERS**
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Sutherland Paper Co., Kalamazoo, Mich.

**POWER TRANSMISSION**
The Hill Clutch Co., Cleveland, Ohio.

**PRINTERS' ROLLERS**
American Printers' Roller Co., 316 West Grand Ave., Chicago, Ill.

**PULP (Chemical)**
American Transmarine Co., 13 Park Row, New York City.
J. Andersen & Co., 21 East 40th St., New York City.
Eastern Manufacturing Co., 501 Fifth Ave., New York City.
Hart Trading Co., Inc., Tribune Bldg., New York City.
Daniel M. Hicks, 140 Nassau St., New York City.
E. J. Keller Company, 200 Fifth Ave., N. Y. C.
New York Overseas Co., Inc., 17 Battery Place, New York City.
Price & Pierce, Ltd., 30 East 42nd St., New York City.
The Pulp & Paper Trading Co., 21 East 40th St., New York City.
Scandinavian-American Trading Co., 50 East 42d St., New York City.

**PULP AND PAPER MACHINERY**
Beloit Iron Works, Beloit, Wis.
Moore & White Co., Philadelphia, Pa.
Valley Iron Works, Appleton, Wis.

**PULP WASHERS**
The Green Bay Foundry and Machine Co., Green Bay, Wis.

**PUMPS (Paper)**
Buffalo Steam Pump Co., Buffalo, N. Y.
Dean Bros., Indianapolis, Ind.

**PUMPS (Vacuum)**
American Steam Pump Co., Battle Creek, Mich.
Buffalo Foundry and Machine Co., Buffalo, N. Y.
Thos. H. Savery, Republic Bldg., Chicago, Ill.
Dean Bros., Indianapolis, Ind.

**RAG AND PAPER DUSTERS**
Holyoke Machine Co., Holyoke, Mass.

**ROTARY VACUUM PUMPS**
Sandusky Foundry & Machine Co., Sandusky, O.

**RUBBER ROLLS**
United States Rubber Co., New York and Chicago

**ROLL GRINDING**
Bevis & Shartle Mch. Co., Middletown, O.

**ROLL WRAPPING MACHINES:**
Nekoosa Motor & Machine Co., Nekoosa, Wis.

**ROTARY SCREEN**
Thos. H. Savery, Republic Bldg., Chicago, Ill.

**SAVE-ALLS**
The Green Bay Foundry and Machine Co., Green Bay, Wis.

**SAWS**
Simonds Manufacturing Co., Fitchburg, Mass.

**SCREEN PLATES**
Central Mfg. Co., Kalamazoo, Mich.
Union Screen Plate Co., Fitchburg, Mass.

**SCREEN DIAPHRAGMS**
United States Rubber Co., Chicago, Ill.

**SHOWER PIPES**
Sandusky Foundry and Machine Co., Sandusky, Ohio.

**SPEED CHANGES**
Moore and White Co., Philadelphia, Pa.

**STEAM JET CONVEYORS**
American Steam Conveyor Corp., Chicago, Ill.

**STOCK CIRCULATING SYSTEM**
Claflin Engineering Co., Lancaster, Ohio.
Ticonderoga Machine Works, Ticonderoga, N. Y.

**STOCK PUMPS**
Buffalo Steam Pump Co., Buffalo, N. Y.

**STOCK SHREDDER**
The Green Bay Foundry and Machine Co., Green Bay, Wis.

**SUCTION ROLLS**
Sandusky Foundry and Machine Co., Sandusky, Ohio.

**SULPHUR**
Union Sulphur Co., 17 Battery Place, New York City.

**SULPHUR BURNERS**
Valley Iron Works Co., Appleton, Wis.

**TIERING MACHINES**
Economy Engineering Co., Chicago, Ill.

**TURBINES (Water)**
James Leffel and Co., Springfield, Ohio.

**VACUUM SYSTEMS**
Open Coil Heater and Purifier Co., Indianapolis, Ind.

**VALVES**
The Crane Co., Chicago, Ill.

**VARIABLE SPEED ENGINES**
The Brownell Co, Dayton, O.
Chandler and Taylor, Indianapolis, Ind.
Erie Engine Works, Erie, Pa.
Hooven, Owens, Rentschler Co., Hamilton, O.

**VENTILATING SYSTEMS**
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.
Buffalo Steam Pump Co., Buffalo, N. Y.
B. F. Perkins and Son, Inc., Holyoke, Mass.

**WASHER WIRES**
The W. S. Tyler Co., Cleveland, O.

**WASTE PAPER STOCK**
Robert Blank, 140 Nassau St., New York City.
Gatti-McQuade Co., 200 Fifth Avenue, New York City.
Francis Hughes Co., 21st and Loomis Street, Chicago.
Main Paper Stock Co., 23-31 Peck Slip, New York City.
F. G. Marquardt, Inc., 345 Broadway, N. Y. C.
Martin Spinelli, 132 Nassau St., New York City.
Mendelson Bros. Paper Stock Co., 910 S. Michigan Blvd., Chicago, Ill.
E. B. Thomas & Co., Inc., 100 Hudson St., New York City.

**WATER FILTER**
The Green Bay Foundry and Machine Co., Green Bay, Wis.

**WATER HEATERS:**
The Sims Co., Erie, Pa.

**WATER-SOFTENING AND PURIFYING SYSTEMS**
Wm. Graver Tank Works, East Chicago, Ind.
Wm. B. Scaife and Sons Co., Oakmont, Pa.

**WATER WHEELS**
James Leffel and Co., Springfield, Ohio.
Holyoke Machine Co., Holyoke, Mass.

**WET MACHINES**
Valley Iron Works Co., Appleton, Wis.

**WIRE SIGNS**
Cheney Bigelow Wire Works, Springfield, Mass.

**WRAPPING MACHINES**
Nekoosa Motor and Machine Co., Nekoosa, Wis.

*When You Buy* **The "HOLYOKE" GRINDER** *You Get Efficient Grinding*

**Wood Room Equipment**

**Wood Barkers**

**Wood Chippers**

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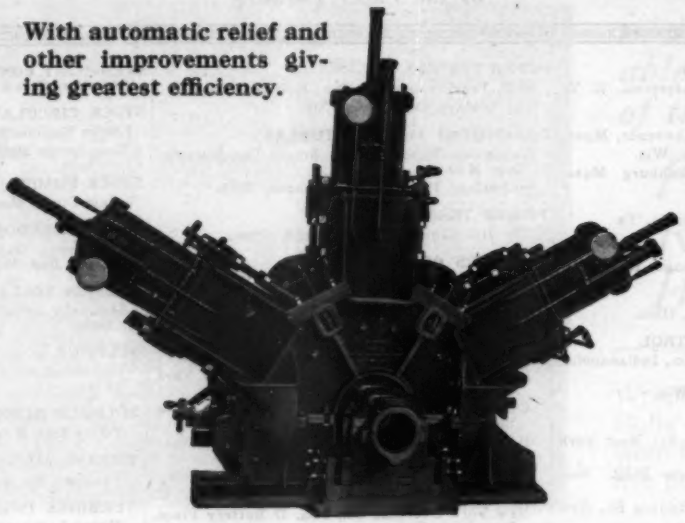

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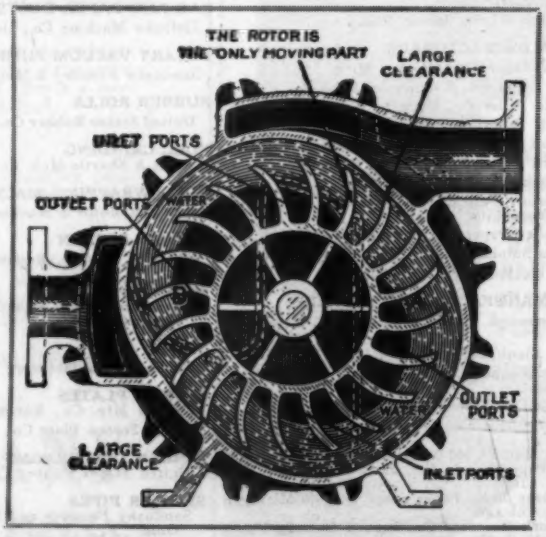

# Buyers' Guide—What and Where to Buy

## Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

**ADHESIVES**
The A .P. R. Mfg. Co., 316 West Grand Ave., Chicago.

**ACID RESISTING BRONZE**
Sandusky Foundry & Machine Co., Sandusky, Ohio.

**AGITATOR EQUIPMENT**
The Hill Clutch Co., Cleveland, Ohio.
Moore & White Co., Philadelphia, Pa.

**AIR CONDITIONING AND CONTROL APPARATUS**
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.

**ANGLE VALES**
The Crane Company, Chicago, Ill.

**ARCHITECTS**
James L. Carey, 208 N. Laramie St., Chicago.

**ASSORTING TABLES**
Moore and White Co., Philadelphia, Pa.

**ASH CONVEYOR SYSTEMS**
American Steam Conveyor Corp., Chicago, Ill.

**BARKERS**
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works Co., Appleton, Wis.

**BARKING DRUMS**
H. O. Numan, Green Bay, Wis.

**BEATER BARS**
John W. Bolton & Sons, Inc., Lawrence, Mass.
R. J. Dowd Knife Works, Beloit, Wis.
L. & I. J. White Co., Buffalo, N. Y.
Simonds Manufacturing Co., Fitchburg, Mass.

**BEATER BED PLATES**
John W. Bolton & Sons, Inc., Lawrence, Mass.
R. J. Dowd Knife Works, Beloit, Wis.
L. & I. J. White Co., Buffalo, N. Y.
Simonds Manufacturing Co., Fitchburg, Mass.

**BEATER ROLL FILLING**
John W. Bolton & Sons, Inc., Lawrence, Mass.
R. J. Dowd Knife Works, Beloit, Wis.
L. & I. J. White Co., Buffalo, N. Y.
Simonds Manufacturing Co., Fitchburg, Mass.

**BEATING, WASHING AND BLEACHING ENGINES**
Beloit Iron Works, Beloit, Wis.
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works Co., Appleton, Wis.

**BEATERS (Continuous)**
Claflin Engineering Co., Lancaster, Ohio.

**BELTING (Rubber)**
United States Rubber Co., New York and Chicago

**BELT DRIVES**
The Hill Clutch Co., Cleveland, Ohio.

**BLEACHING (Propellers)**
Moore and White Co., Philadelphia, Pa.

**BLOWERS**
Buffalo Steam Pump Co., Buffalo, N. Y.

**BOARD MACHINES**
Beloit Iron Works, Beloit, Wis.

**BOARDS (Straw)**
The C. L. La Boiteaux Co., Cincinnati, O.

**BRASS WIRE CLOTH**
Appleton Wire Works, Appleton, Wis.
Cheney Bigelow Wire Works, Springfield, Mass.
Lindsay Wire Weaving Co., Cleveland, Ohio.
W. S. Tyler Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.

**BRIMSTONE**
Union Sulphur Co., 17 Battery Place, New York City.

**BRONZE JACKETS**
Sandusky Foundry & Machine Co., Sandusky, Ohio.

**BUNDLING SYSTEMS**
Signode System, Lake St., Chicago

**CALENDERS**
Beloit Iron Works, Beloit, Wis.
Holyoke Machine Co., Holyoke, Mass.

**CALENDER DOCTORS**
Ticonderoga Machine Works, Ticonderoga, N.Y.

**CALENDER ROLLS**
Holyoke Machine Co., Holyoke, Mass.
B. F. Perkins and Son, Inc., Holyoke, Mass.

**CENTRIFUGAL PUMPS**
American Steam Pump Co., Battle Creek, Mich.
Buffalo Steam Pump Co., Buffalo, N. Y.
Valley Iron Works Co., Appleton, Wis.

**CHIPPERS**
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works Co., Appleton, Wis.

**CHIPPER AND BARKER KNIVES**
John W. Bolton & Sons, Inc., Lawrence, Mass.
L. & I. J. White Co., 85 Columbia St., Buffalo, N. Y.
Simonds Manufacturing Co., Fitchburg, Mass.
R. J. Dowd Knife Works, Beloit, Wis.

**CLAYS AND FILLERS**
Binney & Smith Co., 81 Fulton St., N. Y. C.
Daniel M. Hicks, 140 Nassau St., New York City.
The John W. Higman Co., Inc., 29 Broadway, New York City.
Miner-Edgar Co., 30 Church St., New York City.

**COAL BUNKERS**
The Brownhoist Co., Cleveland, Ohio.

**COATED PAPERS**
Bardeen Paper Co., Otsego, Mich.
Bermingham & Prosser, Chicago, Ill.
Bryant Paper Co., Kalamazoo, Mich.
Monarch Paper Co., Kalamazoo, Mich.
Rex Paper Co., Kalamazoo, Mich.
Seaman Paper Co., Chicago, Ill.
Watervliet Paper Co., Watervliet, Mich.

**CRANES**
The Brownhoist Co., Cleveland, Ohio.
John F. Byers Co., Ravenna, Ohio.
Northern Engineering Works, Detroit, Mich.

**CYLINDER MOLDS**
Appleton Wire Works, Appleton, Wis.
Cheney Bigelow Wire Works, Springfield, Mass.
W. S. Tyler Co., Cleveland, Ohio.

**DANDY ROLLS**
Appleton Wire Works, Appleton, Wis.
Central Mfg. Co., Kalamazoo, Mich.
Cheney Bigelow Wire Works, Springfield, Ohio.
Lindsay Wire Weaving Co., Cleveland, Ohio.
W. S. Tyler Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.

**DECKEL FRAME SUPPORTS**
Huband and Nash, Menasha, Wis.

**DRUM WINDERS**
Ticonderoga Machine Co., Ticonderoga, N. Y.

**DRYER FELTS**
Shuler and Benninghofen, Hamilton, Ohio.

**DYESTUFFS**
Binney & Smith, 81-83 Fulton St., N. Y. City.
E. I. Du Pont de Nemours & Co., Wilmington, Del.

**ELEVATORS (Portable)**
Economy Engineering Co., Chicago, Ill.

**ELECTRIC FANS**
B. F. Perkins and Sons, Inc., Holyoke, Mass.

**ELECTRIC HOISTS**
John F. Byers Machine Co., Ravenna, Ohio.
Northern Engineering Co., Detroit, Mich.

**ELEVATING TRUCKS**
Economy Engineering Co., Chicago, Ill.
Moore and White, Philadelphia, Pa.

**ENGINES**
Chandler and Taylor, Indianapolis, Ind.
Erie Engine Works, Erie, Pa.
Hooven, Owens, Rentschler Co., Hamilton, Ohio.

**ENGINEERS**
James L. Carey, 208 North Laramie St., Chicago, Ill.

**EVAPORATORS:**
Buffalo Foundry & Machine Co., Buffalo, N. Y.

**FASTENERS (Screen Plate)**
Union Screen Plate Co., Fitchburg, Mass.

**FELTS AND JACKETS**
Shuler and Benninghofen, Hamilton, Ohio.

**FELT AND WIRE GUIDES**
Huband and Nash, Menasha, Wis.
Moore & White Co., Philadelphia, Pa.

**FOURDRINIER WIRES**
Appleton Wire Works, Appleton, Wis.
Cheney Bigelow Wire Works, Springfield, Mass.
Lindsay Wire Weaving Co., Cleveland, Ohio.
W. S. Tyler Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.

**FIBRE MAKING PROCESSES**
Hall, Ward & Walker, Inc., Sherman Bldg., Watertown, N. Y.

**FILTER (Continuous Suction)**
Green Bay Foundry & Machine Co., Green Bay, Wis.

**FRICTION CLUTCHES**
The Hill Clutch Co., Cleveland, Ohio.
Moore and White Co., Philadelphia, Pa.

**GEARS**
The Hill Clutch Co., Cleveland, Ohio.

**GLUES**
American Printers Roller Co., Chicago, Ill.

**GRINDERS**
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works, Appleton, Wis.

**HEATERS (Feed Water)**
The Sims Co., Erie, Pa.

**HOISTS**
John F. Byers Machine Co., Ravenna, Ohio.
Northern Engineering Co., Detroit, Mich.

**HOSE**
United States Rubber Co., Chicago, Ill.

**HYDRAULIC TURBINES**
Holyoke Machine Co., Holyoke, Mass.
James Leffel and Co., Springfield, Ohio.

**IRON CASTINGS**
Beloit Iron Works, Beloit, Wis.
Valley Iron Works Co., Appleton, Wis.

**JORDAN FILLINGS**
J. W. Bolton & Sons, Inc., Lawrence, Mass.

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## *for Paper Mills*

*Beater Bars* — *Bed Plates* — *Rag Knives* — *Paper Shear Blades*

*Barker Knives* — *Chipper Knives* — *Paper Cutting Knives* — *Circular Cutters*

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*Makers of Better Cutting Knives Since 1847*

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*Brass, Copper and Iron Cloth*
*Bank and Office Railings*

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Cheney Bigelow Wire Works
Established 1842 SPRINGFIELD, MASS.

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## *Standard Grades of Paper Boards*

MANUFACTURED BY

ALTON BOX BOARD & PAPER COMPANY

CHICAGO COATED BOARD COMPANY

SALES DEPARTMENT
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CHICAGO, ILL.

**F. D. WILSON, Sales Manager**
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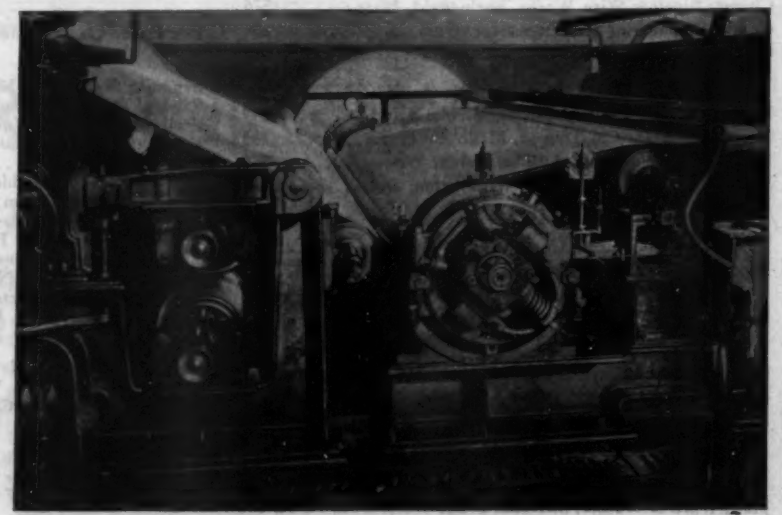
**Hammermill Paper Company**
**Wausau Sulphate Fibre Company**
**Crocker, Burbank & Company**
**West Virginia Pulp & Paper Company**



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**and many other representative mills, some of whom are using as many as 23 Suction Rolls**

*SEND FOR PARTICULARS*

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